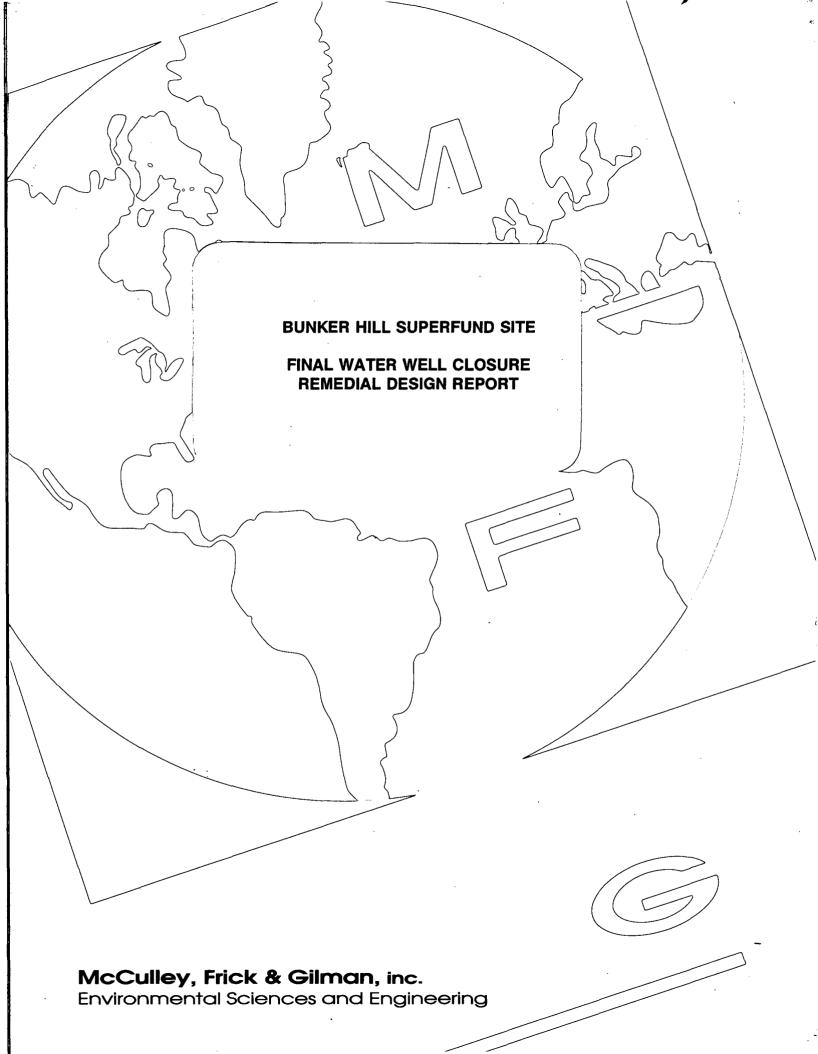
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USEPA SF 1208024



# **BUNKER HILL SUPERFUND SITE**

# FINAL WATER WELL CLOSURE REMEDIAL DESIGN REPORT

March 1994

Prepared For:

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# BUNKER HILL SUPERFUND SITE FINAL WATER WELL CLOSURE REMEDIAL DESIGN REPORT

# 1.0 INTRODUCTION

The purposes of this Remedial Design Report (RDR) are to 1) present an inventory of known water wells at the Bunker Hill Site, 2) identify those requiring closure and replacement with a tie-in to a municipal water system, and 3) to provide methods for well closure, as appropriate. Well closure is included under the remedial alternative for the Site described in the September 1992 Record of Decision (ROD). The remedial design, as developed in this RDR, clarifies and refines the intent of the concepts outlined in the ROD and the Statement of Work (SOW). This RDR presents performance objectives and Performance Standards for the well-closure activities, technical analyses of various well-closure issues, and discussion of design and construction considerations.

Although all known water wells within the Bunker Hill Superfund Site are addressed by this RDR, consistent with the Consent Decree, only that portion of work within the Boundaries of Area I will be included in subsequent Residential Areas Annual Remedial Action Work Plans. Each year, a Residential Areas Annual Remedial Action Work Plan will be prepared to address all Elements of Work within a Reasonably Segregable Area of the Area I Map (Attachment C to the Consent Decree), or portion thereof, expected to be completed during a single construction season. These Elements of Work include residential yards, rights-of-way, commercial properties, and water well closures.

#### 1.1 BACKGROUND

A Technical Memorandum [McCulley, Frick & Gilman, Inc. (MFG), 1992] prepared in conjunction with the Bunker Hill Site Feasibility Study (FS) preliminarily addresses major well-closure issues. Topics addressed in the Technical Memorandum include the location and completion details of known wells within the study area;

recommendations as to which wells should be considered for closure; identification of residences possibly requiring tie-in to alternative water supplies after well closure; State of Idaho requirements for well closure; and preliminary recommendations concerning well-closure methods. Well information included in the Technical Memorandum and summarized in this RDR was obtained from two sources:

- Dames & Moore, 1989, Bunker Hill Site RI/FS, Subtask 3.1, Technical Memorandum: Inventory of Wells (Revised); Document Number 15852-PD012/31020; and
- Pintlar Corporation, 1991, Water Source Survey Report, Unpublished, dated March 6, 1991.

The former document provides the results of a well survey based on the records of the Idaho State Engineer's Office. This document was approved by EPA and is part of the Administrative Record for the Site. The latter document provides the results of a door-to-door survey wherein well owners were interviewed to obtain well location and construction details. The Pintlar document includes a series of approximately 30 to 40 large-scale (1" = 100') maps showing the locations of the water wells as located in the field. Also, supplementary information was obtained from Bunker Hill files and various documents, including theses and dissertations, from the University of Idaho (UID).

This RDR refines the preliminary assessments presented in the Technical Memorandum. Three categories of wells are addressed herein:

- domestic wells (those used for household and domestic irrigation purposes; this category also includes springs for water source inventory purposes);
- industrial wells (those used to obtain water for ore refining activities or other commercial uses); and
- monitoring/aquifer test wells (those used during investigative activities to characterize water levels, water quality, and aquifer properties).

Specifically, this RDR provides:

- methods to establish the number of water wells requiring closure at the Bunker Hill Site;
- methods to establish the number of closed water wells requiring replacement by municipal water systems;
- detailed procedures and specifications for well closure that are consistent with State of Idaho well-closure regulations; and
- procedures and specifications for providing tie-ins to existing municipal water systems.

The Bunker Hill Superfund Site has been divided in connection with the Consent Decree with the Settling Defendants, as delineated on the Allocation Map, included as Attachment C to the Consent Decree. This map shows portions of the Site, delineated as Area I, allocated to the Settling Defendants. These boundaries are included on well location maps presented herein, and related discussions delineate the numbers of wells within Area I and outside of Area I.

The scope of the RDR is limited to wells whose presence within the Superfund Site boundaries has been documented during well surveys conducted during the Remedial Investigation (RI), by Pintlar Corporation, and by information obtained from Bunker Hill files and UID. Subsequently identified wells within Area I, if any, will be addressed utilizing the procedures presented herein. The need for closure of subsequently identified wells within Area I will be evaluated on a case-by-case basis.

# 1.2 PERFORMANCE OBJECTIVES AND STANDARDS

The objective of the Water Well Closure Element of Work, both for Area I and for other parts of the Site, is to assure adequate supplies of water and to minimize exposure to on-site surface and ground waters by reducing:

- the potential for human ingestion and/or contact with contaminated ground water;
- the potential for ground-water contamination from surface sources; and
- the number of potential vertical conduits for contaminant migration in ground water.

Performance Standards for the Well Closure Element of Work are listed below.

- All ground-water wells that are in the main valley aquifer, either upper zone, lower zone, or other contaminated wells shall be closed or abandoned according to the methods presented herein and the State of Idaho requirements.
- The need for closure of domestic wells within Area I will be contingent upon the adoption of effective controls on the drilling of new wells or the use of ground water for domestic purposes within Area I by the appropriate agency or authority. The controls will be consistent with the draft Bunker Hill Area of Drilling Concern Document and Management Plan released for review by the Idaho Department of Water Resources in January, 1994 or will provide other effective control of ground water for domestic use. However, existing industrial/commercial wells within Area I that exhibit the potential for downward flow of contamination from the upper to lower aquifer zone will be closed regardless of adoption of a well-drilling prohibition other effective orrestrictions.
- Residences serviced by a well selected for closure, which are not already serviced by a municipal water system, will be attached to the system.

# 2.0 TECHNICAL ANALYSIS

The objectives of the technical analysis are to:

- present an overview of the well-closure component of the site remedy, including State of Idaho well-closure requirements and how these requirements will be met through the closure methods presented in this RDR;
- provide a summary of well inventory and closure information provided in the Technical Memorandum (MFG, 1992a):
- describe the framework of a public notification program which should precede well-closure activities;
- describe methods that will be used to refine the number of wells requiring closure and municipal water supply tie-ins;
- describe an assessment of the possible magnitude of contaminant transfer between the Upper and Lower Zones of the main valley ground-water system attributable to potentially leaking wells; and
- describe attempts to locate wells potentially covered by the CIA.

#### 2.1 REMEDY OVERVIEW

Closure of certain water wells within the Bunker Hill Superfund Site is included in the overall site remedy to achieve the performance objectives and Performance Standards presented in Section 1.2.

The well-closure component of remedial activities at the Bunker Hill Superfund Site is comprised of the following:

- identification of domestic, industrial, and monitoring/aquifer test wells requiring closure;
- closure of such wells using methods that are consistent with State of Idaho well-closure requirements;
- replacement of wells that are closed with tie-ins to alternate water sources, where necessary and where such sources do not already exist.

# 2.1.1 Compliance with State and Federal ARARs

The remedial design presented in this RDR has been developed to provide for attainment of Performance Standards and to correspondingly comply with pertinent aspects of State and Federal Applicable or Relevant and Appropriate Requirements (ARARs). No Federal ARARs are identified for water-well closure at the Bunker Hill Site. The ability to comply with State regulations pertinent to the design and construction phase is summarized below.

The performance objectives and Performance Standards for water well closure actions at the Bunker Hill Superfund Site are listed in Section 1.2. A primary Performance Standard is closure using methods that are consistent with State of Idaho well-closure potentially modified regulations, as by any requirements promulgated by the State. These regulations comprise the ARAR for well closure in the Bunker Hill Site. Information regarding State well-closure requirements is provided by the Idaho Department of Water Resources (IDWR) in a booklet entitled "Rules and Regulations, Well Construction Standards" (State of Idaho Department of Water Resources, 1989). Rule 3,12, in the IDWR booklet, is entitled "Abandonment of Wells" and consists of the following:

The well owner is charged with maintaining and Rule 3,12,1: abandoning a well in a manner that will prevent waste and/or contamination of the ground water. Permanently abandoned wells may have the casing removed or left in place and shall be filled with bentonite grout, concrete, or puddling clay or other material as required to stop the upward or downward movement of water. If the well is artesian¹, cement grout, concrete, or a packer approved by the Director shall be placed across the confining stratum overlying the artesian zone so as to prevent subsurface leakage from the artesian The remainder of the well shall be filled zone.

According to the Idaho Department of Water Resources, "artesian water" means any water that is confined in an aquifer under pressure so that the water will rise in the well casing or drilled hole above the elevation where it was first encountered. The term includes water of flowing wells and water under pressure in wells that do not flow.

with cement grout, concrete, or other approved material.

Rule 3,12,2: The Director may require the abandonment of a well in compliance with the provisions of Rule 3,12,1 if the condition of the well does not meet minimum well construction standards or if there is no valid water right or other authorization acceptable to the Director for use of the well.

As detailed in Sections 3.1.1 and 3.1.2, water wells within the Bunker Hill Site requiring closure will be decommissioned by leaving the casing in place and filling the well casing with concrete from bottom to top using a tremie pipe. This closure method is consistent with Rule 13,12,1, in the IDWR booklet. some cases, well closure will include casing perforation and pressure grouting to limit the vertical movement of ground water. These cases are described in Section 3.1.1. All well-closure methods described in this RDR meet or exceed applicable state requirements. Therefore, closure using these methods should attain the ARAR for well closure. As noted in Section 3.2, new municipal water supply tie-ins will be provided to replace wells that are closed, where appropriate. Therefore, the well-closure activities presented in this RDR are expected to meet the performance objectives and Performance Standards listed in Section 1.2.

# 2.2 WELL INVENTORY AND CLOSURE SELECTION SUMMARY

An overview of the various water-bearing units in the main valley and tributary valleys of the South Fork Coeur d'Alene River (SFCDR) within the Site is provided below to support the selection of wells requiring closure. Appendix A provides well inventory and closure information. This information represents a refinement from that presented in the Technical Memorandum (MFG, 1992a). Tables in Appendix A also identify those wells included in Area I and wells that are located in other parts of the Site. Area I is also shown on the well location maps provided in Appendix A.

The dominant feature of the study area is the valley of the SFCDR, which flows from east to west through the project area.

Steep hillsides on the north and south of the valley consist of metasedimentary bedrock units overlain by a colluvial/slope wash soils. The SFCDR Valley is partially filled with unconsolidated alluvial and lacustrine (lake-deposited) materials which comprise the principal hydrogeologic system within the study area. These materials occur in three distinct units termed the Upper, Confining, and Lower Zones during the RI. Upper and Lower Zones consist of alluvium and are separated throughout most of the study area by the lacustrine, silty to clayey Confining Zone. Ground water in the Upper Zone is unconfined and that in the Lower Zone is confined. In the Kellogg area, the Confining Zone is inferred to pinch out, and east of this point the Upper and Lower Zones merge to form a single, unconfined ground-water unit. Historically, most large-capacity water-supply wells in the project area were completed within the Lower Zone. Detailed discussion of the Site hydrogeology is provided in the RI Report.

# 2.2.1 Domestic Water Sources

Information regarding reassessment of ownership and closure requirements for domestic water supplies, relative to information provided in the Technical Memorandum (MFG, 1992a), is presented in Table A-1, Appendix A. The locations of these non-municipal domestic water supplies are shown on Figure A-1, Appendix A. Additional data on domestic well closures, including closure material estimates and materials required for municipal tie-in, are provided in Table A-2, Appendix A.

Domestic water sources in the study area are located in tributary gulches, on the hillsides, and in the Upper and Lower Zones of the main valley of the SFCDR. For the purposes of this discussion, domestic wells include those used for primary drinking water supplies and those used for secondary purposes such as irrigation. Overall, 114 domestic water supplies are identified (Tables A-1 and A-2). Of these, 97 are located within Area I, one may be within Area I (location data are unavailable), and 16 are located outside of Area I.

Domestic wells identified as not requiring closure include those located in the Bear Creek drainage, New Hilarity Gulch, and bedrock wells in the hillsides. These wells are not selected for closure as they are expected to provide water of good quality. Domestic wells identified as possibly requiring closure include those in Humboldt Gulch and in the Pine Creek drainage due to the lack of chemical data characterizing ground water in these areas. Collection and analyses of ground-water samples from these drainages is necessary to assess ground-water quality conditions and the corresponding need for domestic well closure, if any. Other domestic wells possibly requiring closure are those reportedly used for irrigation purposes. Closure of these wells will be evaluated on a case-by-case basis considering:

- the willingness of the owner to close the well;
- the availability of institutional controls to prohibit human consumption of ground water should the well remain open;
- the potential strain on municipal water supplies should irrigation wells be replaced with a municipal tie-in; and
- possibly analytical results from ground-water samples.

Of the 114 identified domestic water sources within the Bunker Hill Superfund Site, 18 are identified as requiring closure, 63 are identified as possibly requiring closure, and 33 are identified as Of the 18 domestic wells selected for not requiring closure. closure, 13 will need to be replaced by a tie-in to a municipal water supply. Of the 63 domestic water supplies identified as possibly requiring closure, 43 will need replacement with a tie-in to a municipal water supply if abandoned, and another six may possibly require such a tie-in if abandoned. Wells listed as possibly requiring replacement with a municipal water supply tie-in include those for which data regarding completion depths, water quality, or the existence of secondary potable water sources are In cases where well owners refuse well closure, not available. attempts will be made to collect ground-water samples from the corresponding wells. These samples will be analyzed for the total

forms of arsenic, cadmium, lead, and zinc. The results of the analyses will be sent to IDWR along with other well closure information for possible future reference (see Sections 3.1.1 and 3.1.2).

As previously noted, many of the above-described wells are located within Area I, and the remainder are located outside of Area I. Details regarding closure of wells within Area I will be provided in each Residential Areas Annual Remedial Action Work Plan, as noted in the SOW. Such details include, but are not limited to, identification of wells to be closed during the corresponding construction season, estimates of material quantities required for well closure, identification of wells requiring replacement with a tie-in to a municipal water supply, and estimates of piping required to facilitate such a tie-in.

# 2.2.2 Industrial Wells

Table A-3, Appendix A, presents summary information regarding industrial wells. Industrial well locations are shown on Figure A-2, Appendix A.

Forty four industrial wells are identified within the Bunker Hill Superfund Site. Of these, six are located within Area I and 38 are located in other parts of the Site. Most of the industrial wells identified at the Site are currently unused. In general, these wells have been in place for several years or decades and it is possible that the well casings are corroded or in otherwise poor condition. As most of these wells are completed (screened) in the Lower Zone, it is therefore possible that some serve as conduits for the vertical transfer of ground water, and thus contaminants, between the Upper and Lower Zones.

Forty one of the 44 identified industrial wells are identified as requiring closure, one is identified as possibly requiring closure, and two are identified as not requiring closure. Of the six industrial wells identified as being located within Area I, four require closure and two do not require closure. Of the 38

industrial wells located outside of Area I, 37 require closure and one may possibly require closure. The total number of industrial wells identified as requiring closure includes several that are reportedly destroyed or covered by the CIA or I-90. However, these wells are included in the total in the event they are located and/or found to be intact. The two industrial wells that are identified as not requiring closure are shallow wells that reportedly function as storm water drains, based on field verification, as noted in Pintlar's Water Source Survey Report. The available construction information for these wells indicate that they do not penetrate the Lower Zone and therefore cannot serve as vertical flow conduits for the transfer of contaminants between the Upper and Lower Zones.

# 2.2.3 Monitoring/Aquifer Test Wells

Monitoring and aquifer test well information is summarized on Table A-4, Appendix A. The locations of monitoring and aquifer test wells installed prior to the RI are shown on Figures A-3A, A-3B, and A-3C, Appendix A. The locations of monitoring and aquifer test wells installed during the RI, and subsequently, are shown on Figure A-3D, Appendix A. Piezometers (small diameter wells used primarily as access points for water-level measurements) are included in this well category.

A majority of the monitoring and aquifer test wells at the Site are two inches or less in diameter and are completed in the Upper Zone. Fewer than 10 monitoring and aquifer test wells are known to be larger than two inches in diameter and most of these wells are completed in the Upper Zone of the SFCDR Valley groundwater system.

Locations are unavailable for wells with the UNK (unknown) prefix (Table A-4, Appendix A). Thirty six UNK wells are thought to exist at the Site based on a search of State records conducted for the RI/FS (see Section 1.1). These wells are reportedly shallow, small-diameter piezometers completed by UID personnel in the Page Pond area. Many of these piezometers have been plugged by

the invasion of fine-grained sediments into the well screens. None of the piezometers appear to be completed in the Lower Zone; therefore, UNK wells probably do not serve as vertical conduits for ground-water communication between zones. The location and subsequent abandonment of UNK wells will be done on a case-by-case basis during well-closure proceedings.

All monitoring/aquifer test wells are selected for near-term closure except for those installed during the RI and those installed by UID personnel in the Bureau of Land Management (BLM) test plot on Smelterville Flats. These wells are expected to be used for continued monitoring during remedial design implementation and will be selectively closed when no longer needed. A total of 463 monitoring and aquifer test wells are identified within the Site. Of these, 133 are located in Area I and 274 are located in other parts of the Site. Location data are unavailable for the remaining 56 monitoring/aguifer test wells. Of the 463 monitoring/aquifer test wells identified, 330 are not expected to be required for monitoring purposes and will undergo near-term closure, providing all can be located. monitoring wells site-wide, and not limited to Area I, will remain monitoring points during and/or use as implementation of remedial activities. The number of monitoring wells remaining open will be dependent upon the final configuration of a Site-wide long-term monitoring network.

# 2.3 PUBLIC NOTIFICATION

Procedures which may promote public awareness and acceptance of the well-closure program are as follows:

- Individuals with wells that require or possibly require closure will be sent a letter describing why such closure is required. The letter will also describe a forthcoming visit by field personnel. A time period in which to expect the visit will be provided in the letter. The letter will include a contact that the resident may call with questions or concerns.
- After letters have been distributed to individuals owning wells requiring or possibly requiring closure, a notice

will be included in the local newspaper(s) which will describe the need for selected well closures within the Site. The public notice will include an invitation for well owners to contact the program office in the event they are not contacted by well closure personnel. In addition, property owners will be asked at the time of yard work negotiations if they have a well. This may result in identification of previously unknown wells requiring closure.

# 2.4 CATEGORIZATION OF POSSIBLE WELL CLOSURES AND MUNICIPAL TIE-INS

Wells considered for possible closure can be divided into three categories:

- wells located in or adjacent to the town of Pinehurst where ground-water quality data are unavailable;
- wells located in the Page area, downgradient of the Page Mine and waste rock dump, where ground-water quality data are unavailable; and
- wells with unknown completion depths and/or screened intervals.

Many of the wells considered for possible closure are domestic wells presently used by residents as either primary or secondary water sources. As noted in Section 2.3, contact with these residents will be required to resolve the issue of domestic wells identified as possibly requiring closure and/or tie-in to a municipal water system. All individuals owning wells selected for closure or identified as possibly requiring closure will be contacted. The purpose of this survey will be to resolve the following issues:

- What are the well completion details?
- If the well is abandoned, will a tie-in to a municipal water supply be required (e.g., verification of an existing tie-in or secondary water source)?
- Are there specific difficulties associated with well access (e.g., is the well in a basement, subterranean vault, etc.)?

A work plan describing the well owner survey, which will be conducted at a later date, is provided in Appendix B.

The majority of the domestic water wells in Pinehurst and Page are located within Area I. Resolution of possible well closures in these areas will include collection of representative ground-water samples to characterize ground-water-quality conditions in each A work plan describing the water-quality sampling activities, which will be conducted at a later date, is provided in The Pine Creek drainage, in and adjacent to the town Appendix B. of Pinehurst, contains 40 known domestic wells and 20 domestic wells have been identified in Humboldt Gulch, in and adjacent to the populated area of Page. Fifty percent of the total number of wells identified in these areas have been selected as sampling sites; 20 wells in the Pine Creek drainage and 10 wells in Humboldt Gulch. Wells selected for inclusion in the sampling program are listed below; well numbers correspond to those on Figure A-1, Appendix A:

rst Area	<u>Page Area</u>
100	58
102	59
105	61
106	63
107	64
109	67
110	68
111	71
112	72
	73
	100 102 105 106 107 109 110

The wells selected for ground-water quality sampling form transects across the two sampling areas. Ground-water samples will be collected from the tap closest to the well to minimize potential water-quality impacts from piping. The samples will be handled according to the Field Operating Plan (Dames & Moore, 1987) and analyzed for the total forms of arsenic, cadmium, lead, and zinc. These analyses should provide ground-water quality characterizations for the two drainages with respect to prevalent

Site contaminants. Comparison of the analyses with Federally-promulgated drinking water standards will be used to identify the need for well closure, if any. However, the data collection program is dependent upon cooperation by well owners. The sampling program may need to be modified if some well owners refuse to allow samples to be collected from their taps.

#### 2.5 LEAKAGE STATUS ASSESSMENT

An assessment of the potential leakage status of wells within the Bunker Hill Site was conducted to characterize the magnitude of contaminant transfer between the Upper and Lower Zones possibly associated with this mechanism. For this assessment, site wells were subdivided into the following categories:

- non-leaking wells; and
- potentially leaking wells.

For the purpose of this discussion, non-leaking wells are defined as those that do not penetrate the Lower Zone and thus cannot transmit leakage between the Upper and Lower Zones. A total of 540 non-leaking wells have been identified: 95 domestic wells (Table A-2, Appendix A), 4 industrial wells (Table A-3, Appendix A), and 441 monitoring and aquifer test wells (Table A-4, Appendix A).

Potentially leaking wells, for the purpose of this discussion, include those known to be completed in the Lower Zone and those for which completion depths are unknown. A total of 81 potentially leaking wells have been identified: 19 domestic wells (Table A-2, Appendix A), 40 industrial wells (Table A-3, Appendix A), and 22 monitoring/aquifer test wells (Table A-4, Appendix A). A summary of the leakage status assessment is provided in the following table:

Well Type	Non-Leaking	Potentially Leaking
Domestic Wells	95	19
Industrial Wells	4	40
Monitoring/Aquifer Test Wells	441	22
TOTAL	540	81

Available data for the 22 potentially leaking monitoring/aquifer test wells indicate that these wells are constructed of PVC, which is generally resistant to corrosion in mildly acidic waters, and that these wells are completed with an appropriate annular seal across the Confining Zone (bentonite, grout, or similar material). Therefore, the possibility of vertical ground-water flow within these wells is considered to be small and the issue of interzonal leakage can be restricted to the remaining 59 potentially leaking domestic and industrial wells. As discussed in Sections 2.2.1 and 2.2.2, these wells are all identified as requiring closure. Of these wells, 22 (18 domestic wells and four industrial wells) are located in Area I and 37 (one domestic well and 36 industrial wells) are located in other parts of the Site.

In general, water-quality degradation due to possible vertical ground-water movement would be associated with downward movement of poorer quality Upper Zone water to better quality waters of the Lower Zone, although RI data indicate that Federal drinking water standards for cadmium and lead are exceeded in many parts of the Lower Zone. Recent (fourth quarter 1991 and first quarter 1992) and historic (1987-1988) water-level data from monitoring wells and piezometers at the Site indicate that the vertical hydraulic gradient between the Upper and Lower Zones is downward in the eastern part of the study area and upward in the western part of the study area (MFG, 1992b and 1992c; RI Report). This condition is expected to be permanent as it appears to be primarily related to valley morphology. The transition between the downward and upward gradients in the main valley of the SFCDR occurs near the valley constriction adjacent to the mouth of Government Gulch. The

transition area is illustrated on Figure A-1 (Appendix A). Of the 59 potentially leaking domestic and industrial wells, 18 (eight in Area I and 10 in other parts of the Site) are located east of the valley constriction and the remaining 41 are located west of the valley constriction (Tables A-2 and A-3, Appendix A). If groundwater communication between the Upper and Lower Zones occurs in wells located west of the valley constriction, the likely result would be a beneficial dilution of poorer-quality ground water in the Upper Zone with ground water of better quality from the Lower However, such dilution does not obviate the need for Lower Zone well closure, as prevention of human consumption of waters exceeding Federal drinking water standards is a focus of the wellclosure activities. Ground-water communication between the Upper and Lower Zones in the 18 potentially leaking wells east of the valley constriction could result in degradation of ground-water quality in the Lower Zone by poorer-quality Upper Zone ground water. Of the 18 potentially leaking wells in the eastern portion of the Site, 12 are completed in the Lower Zone and six have undocumented completion depths. One of the six industrial wells with undocumented completion depths (industrial well #44) may not require closure because it reportedly serves as a recharge well for storm water drainage and is thought to be a shallow, Upper Zone completion.

# 2.6 LOCATION OF WELLS POTENTIALLY COVERED BY THE CIA

Several industrial wells appear to be covered by the CIA. All of these wells, which are located outside of Area I, were identified in a literature search described in the Technical Memorandum (MFG, 1992a). Measures taken to locate wells possibly covered by the CIA are described below.

The method characterized as being most appropriate for locating the covered wells is the use of geophysical instruments. A portable magnetometer was considered the most accurate instrument for detecting subsurface metal casings. Principles underlying the use of the magnetometry instrument and related data-reduction methods are described briefly in Section 4.2.1 of the Technical

Memorandum (MFG, 1992a). A magnetometry survey of the Middle and West Cells of the CIA was performed during April 1992. Survey methods and data reduction techniques are presented in Appendix C.

The magnetic survey did not provide useful information with respect to the locations of covered wells. The presence of metallic objects of various sizes and the probable presence of magnetite or other magnetic compounds in the slag comprising the CIA West Cell apparently serve to mask the magnetic effects which might be associated with covered wells. A magnetometry measurement was taken from the steel cover on an exposed six-foot-diameter well casing near the toe of the West Cell. Results from this measurement did not differ significantly from other measurements in the area, suggesting that the "noise" from metal-bearing materials in the area masks the magnetic effects of individual metallic objects.

Four anomalies were detected from the magnetic survey, two of which are associated with buried or exposed pipe. The other two anomalies are localized in areas distant from the approximate locations of the abandoned industrial wells, suggesting that the anomalies are associated with covered metallic objects other than the wells, such as large pieces of metal scrap.

No additional efforts are planned to locate wells potentially covered by the CIA. Methods that may reliably be used to locate such wells are unavailable and, even if such wells could be located, accessing them for closure would likely be impractical due to the large volume of slag, gypsum, or tailing overburden that would require removal. It is possible that some wells may be exposed during regrading of the West Cell. If this occurs, any such wells will be closed according to the closure protocols presented in Section 3.1.

# 3.0 DESIGN

This section provides methodologies that are consistent with State of Idaho requirements for the closure of small- and large-diameter wells within the Bunker Hill Site. Also provided are discussions of municipal water system tie-in specifications.

#### 3.1 WELL-CLOSURE METHODS

Proper closure of wells in the Bunker Hill Superfund Site will provide protection of humans from contaminated ground water, reduce ground-water contamination from surface sources, and reduce the number of potential vertical conduits for ground-water contaminant migration. Site water wells may be divided into two categories for well-closure purposes: 1) small-diameter wells, and 2) diameter wells. Small-diameter wells include those with diameters less than five feet; this category includes the majority of site wells. Large-diameter wells are those with diameters of five feet or more. The prescribed closure method for small-diameter wells is presented in Section 3.1.1; that for large-diameter wells is presented in Section 3.1.2. Well-closure field activities will be coordinated with other Site remedial activities to promote efficient utilization of personnel, equipment, and materials. IDWR will be informed of the commencement and progress of the wellclosure activities and will be invited to provide oversight at their discretion.

# 3.1.1 Closure of Small-Diameter Wells

Most small-diameter wells in the Bunker Hill Site can effectively be closed using methods set forth in Rule 13,12 of IDWR's "Rules and Regulations, Well Construction Standards". However, IDWR has indicated that closure of the potentially leaking small-diameter wells located in the eastern part of the main valley should include casing perforation and pressure grouting over a 10-foot interval spanning the Upper Zone/Confining Zone interface. These procedures are intended to limit potential downward groundwater movement in the annular space between the well casing and the

aquifer material. According to IDWR, these procedures can be limited to domestic and industrial wells because monitoring and aquifer test wells are typically constructed to preclude groundwater flow within the annulus. Also, as noted in Section 3.1.2, IDWR has waived the necessity of perforating and pressure grouting large-diameter wells due to the infeasibility of achieving adequate pressure within the well casing.

Examination of leakage status and well location information presented on Tables A-2 and A-3 (Appendix A) indicates that the following small-diameter wells will require perforation and pressure grouting (identification numbers are those presented on Tables A-2 and A-3 and Figures A-1 and A-2, Appendix A):

Domestic Wells		<u> Industrial Well</u>		
3*	13*	7		
6	15*	15		
10*	17*			
12*	•			

\* - Well located in Area I

The locations of industrial wells 9, 13, and 14 are consistent with criteria used to establish the need for perforation and pressure grouting. However, these wells are thought to be covered by the CIA and therefore are not included in the above listing. If uncovered during regrading activities, these wells will be closed using perforation/pressure-grouting protocol.

The closure procedure for small-diameter wells requiring casing perforation and pressure grouting is provided below:

- 1. The field crew will arrange a mutually acceptable date and time with the well owner for closure operations.
- 2. Each surface casing and surrounding area will be visually inspected to ensure the desired well is being closed. Careful well identification is important at the Site due to the large number of wells with unlabeled surface casing or no surface casing.

- 3. If present, electrical lines to well pumps will be disconnected and wiring removed prior to closure procedures.
- 4. If present, pumps, pipe, and wiring will be pulled from wells requiring closure. If necessary, a pulling unit or drill rig will be mobilized to the Site to remove such downhole items.
- 5. Each well will be measured for total depth and depth to ground water before being closed to ensure freedom from obstructions that may interfere with effective sealing operations. These data will be recorded for potential future reference.
- 6. A 10-foot interval of well casing spanning the Upper Zone/Confining Zone interface will be identified based on available lithologic characterizations of the well vicinity. The well casing in this interval will be perforated using any of several commonly used methods (e.g., Mill's knife, Hawk downhole perforator, cavity shots, etc.).
- 7. Slurried sealing materials (see Section 3.1.3) will be placed under pressure from the bottom of the well to near the ground surface using a tremie pipe and packer or pressure coupling. This method will reduce potential segregation or dilution of materials. Sealing materials will be mixed in either a portable grout plant or obtained from a ready-mix concrete plant. A protective strainer will be used on the tank from which the material is pumped to avoid plugging the well casing with lumps of unmixed material.
- 8. After removal of pressure couplings or packers, the well casing will be backfilled with sealing material to a point level with the ground surface to limit movement of surface waters down the well bore.
- 9. Each well will be marked with the well identification number (listed in Appendix A) and the date of closure. This information will be stamped or painted on the well casing, if practicable.
- 10. Complete records will be kept of the closure procedures for future reference. Recorded information will include:
  - the quantity and type of sealing materials used;
  - the method(s) used to place sealing materials;
  - static water levels and total well depths;
  - other observations made during well closure; and
  - a sketch map of the well location.

An example of well-closure form that could be used to document well abandonment is included in Appendix B.

- 11. All contract work requiring drillers will be performed by licensed drilling contractors. A qualified individual will oversee all abandonment procedures and keep an accurate record of events and materials used.
- 12. A copy of each well abandonment record will be mailed to IDWR for their records (Idaho Department of Water Resources, Northern Region, Suite 210, 1910 Northwestern Boulevard, Coeur d'Alene, Idaho, 83814-2615).

The closure procedure for small-diameter wells **not** requiring perforation and pressure grouting is as follows:

- 1. The field crew will arrange a mutually acceptable date and time with the well owner for closure operations.
- 2. Each surface casing and surrounding area will be visually inspected to ensure the desired well is being closed. Careful well identification is important at the Site due to the large number of wells with unlabeled surface casing or no surface casing.
- 3. If present, electrical lines to well pumps will be disconnected and wiring removed prior to closure procedures.
- 4. If present, pumps, pipe, and wiring will be pulled from wells requiring closure. If necessary, a pulling unit or drill rig will be mobilized to the Site to remove such downhole items.
- 5. Each well will be measured for total depth and depth to water before being closed to ensure freedom from obstructions that may interfere with effective sealing operations. These data will be recorded for potential future reference.
- 6. Slurried sealing materials (see Section 3.1.3) will be placed from the bottom of the well to near ground surface using a tremie pipe. This method will reduce potential segregation or dilution of materials. Sealing materials will be mixed in either a portable grout plant or obtained from a ready-mix concrete plant. A protective strainer will be used on the tank from which the material is pumped to avoid plugging the well casing with lumps of unmixed material.
- 7. Well casings will be backfilled with sealing material to a point level with the ground surface to limit the movement of surface waters down the well bore.

- 8. Each well will be marked with the well identification number (listed in Appendix A) and the date of closure. This information will be stamped or painted on the well casing, if practicable.
- 9. Complete records will be kept of the closure procedures for future reference. Recorded information will include:
  - the quantity and type of sealing materials used;
  - the method(s) used to place sealing materials;
  - static water levels and total well depths;
  - other observations made during well closure; and
  - a sketch map of the well location.

An example of a well-closure form that could be used to document well abandonment is included in Appendix B.

- 10. All contract work requiring drillers will be performed by licensed drilling contractors. A qualified individual will oversee all abandonment procedures and keep an accurate record of events and materials used.
- 11. A copy of each well abandonment record will be mailed to IDWR for their records (Idaho Department of Water Resources, Northern Region, Suite 210, 1910 Northwestern Boulevard, Coeur d'Alene, Idaho, 83814-2615).

# 3.1.2 Closure Of Large-Diameter Wells

Nine industrial wells have casing diameters of 72 inches with casing depths ranging from 48.9 to 89.0 feet below ground surface. One industrial well has a casing diameter of 60 inches; casing depth is unknown, but boring depth is reportedly 63.5 feet below ground surface. Large-diameter wells are numbered as follows on Table A-3 and Figure A-2 in Appendix A:

2*	10
3	21
4	22
5	23
6	

\* - Well located in Area I.

All of the large-diameter wells are thought to penetrate the Lower Zone and thus may potentially serve as conduits for the transfer of waters between the Upper and Lower Zones. Such transfer could occur within the well bore, if the well casings are in sufficiently poor condition to allow entry of Upper Zone waters. Waters may also migrate vertically along the annular space, if any, between the well casing and subsurface materials. Casing perforation and pressure grouting, as described above for certain small-diameter wells, would likely preclude any transfer of ground water between the Upper and Lower Zone. However, experience indicates the infeasibility of achieving adequate pressure to effectively grout wells of such large diameter. For this reason, IDWR has waived the necessity of perforating and pressure-grouting the large-diameter wells.

Closure of the above-listed large-diameter wells will require large volumes of sealing materials. Therefore, two alternatives are presented for the closure of large-diameter wells; both are consistent with State well closure regulations and are expected to meet the Performance Standards listed in Section 1.2. The selection of one alternative over the other will be based on cost considerations, as reflected in subcontractor cost proposals. Alternative 1 is the same as that for small-diameter wells not requiring perforation and pressure grouting, as described in the preceding section. Alternative 2 involves the use of cobbles in the sealant matrix, as described in the following procedure.

- Each surface casing and surrounding area will be visually inspected to ensure the desired well is being closed. Careful well identification is important at the Site due to the large number of wells with unlabeled surface casing or no surface casing.
- 2. If present, electrical lines to well pumps will be disconnected and wiring removed prior to closure procedures.
- 3. If present, pumps, pipe, and wiring will be pulled from wells requiring closure. If necessary, a pulling unit or drill rig will be mobilized to the Site to remove such downhole items.
- 4. Each well will be measured for total depth and depth to water before being closed to ensure freedom from obstructions that may interfere with effective sealing operations. These data will be recorded for potential future reference.

- 5. A tremie pipe comprised of steel or other material with high compressive strength will be extended from the surface to a point near the bottom of the well casing.
- 6. The well will then be backfilled with gravel-to-cobblesize material in ten-foot increments. Use of ten-foot increments is intended to reduce the potential for the tremie pipe to become lodged in the borehole by pressure from the gravel/cobble matrix.
- 7. A sealing agent (see Section 3.1.3) will be pumped through the tremie pipe to the base of the boring, filling in pore spaces within the gravel/cobble matrix. Sealing materials (slurries) will be placed from the bottom to the upper surface of each 10-foot gravel layer. This method will reduce potential segregation or dilution of materials. Sealing materials will be mixed in either a portable grout plant or obtained from a ready-mix concrete plant. A protective strainer will be used on the tank from which the material is pumped to avoid plugging the well casing with lumps of unmixed material.
- 8. When the upper surface of the sealing agent stabilizes at the top of the gravel/cobbles, the tremie pipe will be pulled up to the gravel/cobble surface. The volume of sealing material required to fill the pore spaces in the ten-foot column of gravel will be estimated assuming a porosity of 25 to 40 percent.
- 9. A second 10-foot layer of gravel/cobbles will be introduced into the well casing, and the process will be repeated until the well is backfilled with the gravel matrix and sealing agent.
- 10. Well casings will be backfilled with gravel/cobbles and sealing material to a point level with the ground surface to limit the movement of surface waters down the well bore.
- 11. Each well will be marked with the well identification number (listed in Appendix A) and the date of closure. This information will be painted or stamped on the well casing, if practicable.
- 12. Complete records will be kept of the closure procedures for future reference. Recorded information will include:
  - the quantity and type of sealing materials used;
  - the method(s) used to place sealing materials;
  - static water levels and total well depths;
  - other observations made during well closure; and
  - a sketch map of the well location.

An example of a well-closure form that could be used to document well abandonment is included in Appendix B.

- 13. All contract work requiring drillers will be performed by licensed drilling contractors. A qualified individual will oversee all abandonment procedures and keep an accurate record of events and materials used.
- 14. A copy of each well abandonment record will be mailed to IDWR for their records (Idaho Department of Water Resources, Northern Region, Suite 210, 1910 Northwestern Boulevard, Coeur d'Alene, Idaho, 83814-2615).

Implementation of Alternative 2 would ensure that the large-diameter wells are filled with concrete (i.e., an aggregate/cement mixture). Therefore, this procedure is consistent with State of Idaho well-abandonment protocol.

# 3.1.3 Well-Closure Materials

Concrete containing an expansive additive will be utilized as a sealing agent for the closure of small- and large-diameter wells. A lean, 4-sack concrete mix has been selected. The mix will include Type II portland cement (sulfate resistant), a maximum sand:cement ratio of approximately 5:1 (by volume), a water:cement ratio not exceeding 0.6:1 (by weight), and approximately 4 to 6 percent bentonite (by volume). This mixture has been selected 1) it is expected to provide acceptable confined compressive strength, 2) should not be subject to shrinkage, 3) should be relatively easy to place using a small-diameter tremie pipe, and 4) is cost-effective. Consideration will be given to including Class F fly ash in the mix to improve pumpability and flowability, depending on availability and cost. If fly ash is included, it will replace a portion of the cement and will be used in an amount not to exceed 25 percent of the total cementitious content (cement plus fly ash).

For closure of small-diameter wells, no aggregate larger than coarse sand will be used in the mix. Minor adjustments to the mix may be necessary for wells requiring pressure grouting due to possible limitations associated with the pressure grouting equipment. If Alternative 1 is implemented for the abandonment of large-diameter wells (see the preceding section), it may be

appropriate to include larger aggregate such as gravel in the concrete mix. Inclusion of gravel is likely to increase the compressive strength of the concrete and may be cost-effective. However, a limitation on the use of larger aggregate is potential bridging within the tremie pipe. This could necessitate use of a tremie pipe that is adequately sized for the maximum size of aggregate used for closure of the large-diameter wells. If Alternative 2 is implemented to close the large-diameter wells, the concrete mix should include only sand-sized aggregate to facilitate pressure grouting of void spaces among the backfilled gravels and cobbles. Gravels and cobbles used as backfill under Alternative 2 will contain less than 2 percent material finer than the #4 sieve to ensure that void spaces are easily filled during pressure-grouting activities.

# 3.2 NEW MUNICIPAL WATER SUPPLY TIE-INS

As previously noted (Section 2.2.1), 81 domestic wells require or possibly require closure. Of these wells, 56 will require tiein to a municipal water system and six may possibly require such a
tie-in (Table A-2, Appendix A). The remaining 19 domestic wells
that require or possibly require closure will not require a
municipal water-system tie-in because a secondary potable water
source reportedly is present. Tie-ins to municipal water supplies
will be designed in accordance with existing practices as utilized
by the Central Shoshone County Water District (CSCWD) and/or other
appropriate entities [e.g., Silver Creek Water Company (SCWC),
Pinehurst Water District (PWD), etc.]. Procedures utilized to
connect homeowners to municipal water systems are presently being
developed in conjunction with local water districts. Estimated
quantities of materials required to connect the appropriate
homeowners to municipal water systems are provided in Section 4.2.

#### 4.0 CONSTRUCTION CONSIDERATIONS

Well-closure methods described in Section 3.1 will include well owner notification of pending abandonment, visual inspection of the well area, removal of any obstructions within the well casing, well-depth measurement, introduction of sealing agent with a tremie pipe, and recording of pertinent closure information.

# 4.1 WELL-CLOSURE MATERIAL VOLUMES

Minimum and maximum volumes for well-abandonment materials were estimated using casing volumes for wells with available completion information and casing volume assumptions for wells without available completion information. Casing volume assumptions for wells with no available completion information are as follows:

#### Domestic and Industrial Wells

Upper Zone Completions: Casing Diameter = 6 inches

Casing Depth = 40 feet below ground surface

Lower Zone Completions: Casing Diameter = 6 inches

Casing Depth = 80 feet below ground surface

# Monitoring and Aquifer Test Wells

Upper Zone Completions: Casing Diameter = 2 inches

Casing Depth = 40 feet below ground surface

Lower Zone Completions: Casing Diameter = 2 inches

Casing Depth = 80 feet below ground surface

Maximum material volumes were calculated assuming that all wells possibly requiring closure will be closed. Minimum volumes were calculated assuming that wells possibly requiring closure will not be closed. An additional ten percent of the total material volume was added in some cases to account for excess materials lost through the well screen and during handling.

Closure material volumes for domestic, industrial, and monitoring/aquifer test wells are shown on Tables A-2, A-3, and A-4, respectively, of Appendix A. Estimated closure material volumes for all site wells are summarized in the following table. Specific

material requirements for wells in Area I will be included in each Residential Area Annual Remedial Action Work Plan.

	Minimum Volume		Minimum Volume Maximum Volume	
Well Type	(ft³)	(yd³)	(ft³)	(yd³)
Domestic Wells				
Totals From Table A-2	186	7	1334	49
10% (loss of sealing material)	<u>+19</u>	<u>+1</u>	<u>+133</u>	<u>+5</u>
TOTAL	205	8	1467	54
<u> Industrial Wells</u>				
Totals from Table A-3	20314	752	20314	752
Note: sealant loss not			,	
included; see text				·
Monitoring/Aquifer Test Wells				
Totals from Table A-4	79	3	209	8
10% (loss of sealing material)	+8	<1	+21	+1
Vol of materials for RI wells			-129	<u>-5</u>
TOTAL	87	. 3	101	4

These volume estimates indicate that over 90 percent of the total volume of material required to backfill and abandon wells at the Site will be used for closure of industrial wells, including large-diameter wells. If Alternative 1 is used to close the largediameter wells (see Section 3.1.2), it is reasonable to assume that a 10 percent loss of sealing agent could occur. Therefore, the total volume of concrete sealant required under this alternative is estimated to range from 22,637 ft3 to 23,913 ft3 (838 yd3 to 886 yd3). Should Alternative 2 be used to close the 10 large-diameter wells, the porosity of the gravel backfill must be considered. is estimated that a minimum of 60 to 75 percent of the volume in these wells will be filled with the gravel/cobble matrix, assuming a typical porosity of 25 to 40 percent (Freeze and Cherry, 1979). Therefore, the actual volume of sealant necessary to fill the pore spaces of the gravel/cobble matrix in the 10 large-diameter industrial wells is estimated to range from 4,772 to 7,636 ft<sup>3</sup> (177 to 283 yd3). A 10-percent loss is not included in this estimate, as such losses are expected to be small under Alternative 2. volume of cement grout necessary for closure of all industrial

wells under Alternative 2 should range from 5,997 to 8,861 ft<sup>3</sup> (222 to 328 yd<sup>3</sup>). The total volume of sealant necessary to close all wells, if Alternative 2 is used to close the large-diameter wells, is estimated to range from 6,289 to 10,429 ft<sup>3</sup> (233 to 386 yd<sup>3</sup>).

The sealing material volume estimate for monitoring/aquifer test wells does not include RI wells, because many RI wells will likely remain open for continued ground-water monitoring. As the above data indicate, when RI wells are ultimately closed, it is estimated that approximately 130 ft<sup>3</sup> (5 yd<sup>3</sup>) of sealing material will be required for the closures.

# 4.2 MATERIALS FOR MUNICIPAL WATER SUPPLY TIE-INS

As stated in Section 3.2, tie-ins to municipal water supplies will be installed in accordance with existing practices utilized by the Central Shoshone County Water District (CSCWD) and/or other appropriate entities [e.g., Silver Creek Water Company (SCWC), Pinehurst Water District (PWD), etc.]. Pipe sizes and lengths required to connect owners of closed wells to a main water line were preliminarily estimated in the field by Pintlar personnel during a door-to-door survey (Pintlar Corporation, 1991). Maximum material requirements were estimated assuming that all wells possibly requiring closure will be closed. Minimum requirements were estimated assuming that wells possibly requiring closure will not be closed. These preliminary estimates are summarized below.

DOMESTIC WELLS

Pipe Size (inches)	Minimum Pipe Length (feet)	Maximum Pipe Length (feet)
0.75	795	2800
1.0	0	6100 .
1.25	0	600
2.0	0	1706
4.0	400	460
6.0	2710	4710
8.0	0	1200

These material requirement estimates may be refined based on information gathered to establish the final number of site wells requiring closure.

# 4.3 EQUIPMENT/CREW REQUIREMENTS AND SCHEDULE

Closure of domestic, industrial, and monitoring/aquifer test wells at the Bunker Hill Site is expected to require:

- a truck-mounted drilling rig for tremie pipe placement and manipulations;
- a portable concrete mixing plant (if the specified mix is unavailable from local batch plants);
- a portable grout pump and packer or pressure coupling;
   and
- casing perforation equipment.

It is expected that a crew of two will be sufficient to operate the drilling rig and one additional crew member will be needed to operate the mixing plant and grout pump. A qualified PRP representative will be present at all well closures to record pertinent information for subsequent distribution to IDWR. IDWR will be advised as to scheduling of well closure activities so that oversight can be implemented, as warranted.

Closure of water wells will be coordinated with the implementation of other site remedial activities, to the extent feasible, to minimize community disruption or the disruption of newly installed barriers. For example, domestic wells within residential yards requiring remediation will be closed before yard remediation begins so that access to the well head will not damage newly placed barrier soil and sod. Similarly, industrial wells in Smelterville Flats will be closed before growth medium application and revegetation activities occur.

# 5.0 OPERATIONS AND MAINTENANCE

Domestic, industrial, and monitoring/aquifer test wells are not expected to require any additional operations and maintenance, once properly closed.

#### 6.0 SUMMARY OF PERTINENT REMEDIAL DESIGN INVESTIGATIONS

As detailed in Section 2.4 of this report, the following investigations and evaluations are required to more accurately assess the number of domestic wells requiring closure and the number of residences that will require a tie-in to a municipal water system:

# Field Investigations

- Contact well owners to obtain information, as appropriate, concerning well construction and the presence of existing municipal tie-ins; and
- Obtain ground-water samples from selected domestic wells in the Pinehurst and Page areas. Ground-water samples may be collected from wells in other areas, if deemed necessary to establish the need for well closure.

Work plans for these investigations are provided in Appendix B.

# Laboratory Investigations

• Analyze ground-water samples collected in the Pinehurst and Page areas for the total forms of arsenic, cadmium, lead, and zinc.

#### Data Evaluation

• Compare the results of the laboratory analyses with Federally-promulgated drinking water standards. Wells exhibiting exceedances, if any, will be included in the well-closure program.

#### 7.0 FUTURE DELIVERABLES (PLANS AND REPORTS)

The following described plans and reports will be submitted to IDHW and/or EPA for the Water Well Closure Element of Work at the Site.

#### 7.1 GENERAL PROJECT MANAGEMENT

### 7.1.1 Project Management Monthly Reports

Monthly progress reports submitted pursuant to Section XI of the Consent Decree will include a section on the Water Well Closure Element of Work when applicable. The water well closure section will include a minimum of the following information:

- General description of the work undertaken during the reporting period.
- Specific activities/tasks undertaken during the reporting period, and expected to be undertaken during the next reporting period.
- Identification of issues and actions that have been or will be taken to resolve the issues.
- Status of the water well closure schedule and any proposed schedule changes.

#### 7.1.2 Technical Memoranda

Technical memoranda are the mechanism for requesting material modification of plans, designs, and schedules. Technical memoranda will not be prepared or required for non-material field changes that have been approved by the agencies. In the event that the Settling Defendants determine that modification of an approved plan, design, or schedule is necessary, the Settling Defendants will submit a written request for the modification to the Agency Project Coordinators. The written request will include, but not be limited to, the following information:

- General description of and purpose for the modification.
- Justification, including necessary calculations (if any), for the modification.
- Actions to be taken to implement the modification, including any actions related to subsidiary documents, milestone events, or activities affected by the modification.
- Recommendations.

#### 7.2 REMEDIAL DESIGN

No further design submittals beyond this RDR are required for the Water Well Closure Element of Work.

#### 7.3 REMEDIAL ACTION

Water wells will be closed as part of the overall remedial actions for a Reasonably Segregable Area of Area I. Well-specific remedial actions will be developed as part of the Residential Areas Annual Remedial Action Work Plans, as described below.

#### 7.3.1 Residential Areas Annual Remedial Action Work Plans

Each year the Settling Defendants will submit to the appropriate agencies a Residential Areas Annual Remedial Action Work Plan outlining the proposed Area I remediation activities to be completed during the construction season (barring unusual weather, the construction season will generally occur from mid-June to mid-October). Included in these work plans will be details on water well closure activities. The Residential Areas Annual Remedial Action Work Plans will be submitted by April 15 of each year. At a minimum the work plans will include:

- Scope of the proposed remediation; i.e., the number of water wells to be closed and a map showing their locations.
- Estimated remediation schedule for the construction season.

- Any deviations or changes from the guidelines and procedures outlined in the Water Well Closure RDR.
- Plan for coordinating, integrating, and communicating with the various agencies.
- Description of deliverables and milestones during the construction season.
- An overall description of Work to be performed.
- Technical approach for undertaking, monitoring, and completing the Element of Work.
- Construction O&M requirements.
- QA measures.
- Additional Health and Safety measures.

# 7.3.2 Health and Safety

Health and safety aspects pertaining to water well closures within each Reasonably Segregable Area will be addressed in the corresponding Residential Areas Annual Remedial Action Work Plan. Such aspects include descriptions of monitoring activities to be undertaken during water well closure activities.

# 7.3.3 Annual Construction Completion Report

Construction activities completed during any construction season will be summarized in the Annual Construction Completion Reports. These reports will contain a complete listing and description of construction activities associated with the Water Well Closure Element of Work that were completed during the previous construction season. These reports will be submitted to the agencies, with the well closure parts provided to IDWR, within 60 days after the construction activities for that construction season are completed.

#### 8.0 CERTIFICATION OF COMPLETION OF REMEDIAL ACTION

Certification of the completion of remedial action in a Reasonably Segregable Area is defined as the EPA, in consultation with IDHW, acknowledging the achievement of Performance Standards (as outlined in Section 1.2) for that portion of remediation.

Certification of water well closure will be conducted on a Reasonably Segregable Area basis. Specifically, Residential Area Annual Remedial Action Work Plans will be developed with the goal of closing as many water wells as possible within one or a group of Reasonably Segregable Areas during one construction season. Reasonably Segregable Areas of Area I are defined in the SOW and the Consent Decree. The Performance Standards for water well closures will considered to be achieved when all water wells within each Reasonably Segregable Area have been closed in accordance with this RDR and, when required, the appropriate residences with closed wells are connected to a municipal water supply.

A Pre-Certification Inspection will be conducted within 90 days of concluding that the Performance Standards have been attained for a Reasonably Segregable Area. Within 30 days of the Pre-Certification Inspection, a Completion of Remedial Action Certification Report will be submitted to IDHW and EPA. This Report will serve as the Settling Defendants' documentation supporting the completion of remedial actions and achievement of Performance Standards within the Reasonably Segregable Area and their request for certification from the agencies. The Report will include, but will not necessarily be limited to:

- an overall description of the Report, including its purpose, and a general description of the Reasonably Segregable Area; including the Elements of Work addressed by the Report;
- findings of the Pre-Certification Inspection, including documentation supporting the claim that the applicable Performance Standards have been attained;
- cross references to as-built drawings in the Construction Completion Reports, as appropriate;

- demonstration that all obligations for the Reasonably Segregable Area, as presented in the SOW and the Consent Decree, have been satisfactorily achieved by the Settling Defendants, in accordance with the Consent Decree;
- a statement by the Settling Defendants' Project Coordinator that remedial action has been completed in full satisfaction of the requirements of the Consent Decree;
- a statement by an Idaho-registered Professional Engineer consistent with the Certification of Completion of Remedial Action requirements for commercial properties, rights-of-way, and residential yards, as specified in Appendix E of the Residential Yards RDR.
- a statement by an Idaho-registered Professional Geologist or Professional Engineer that all well closures within the Reasonably Segregable Area are in full satisfaction of the requirements of the Consent Decree.

It is hereby certified that well closures, conducted within a Reasonably Segregable Area of the site known as \_\_\_\_\_\_, as represented by the Well Closure Records and supporting information presented in the Construction Completion reports, are in full satisfaction of the Performance Standards presented in the Area I SOW and the Water Well Closure RDR.

#### 9.0 REFERENCES

- Dames & Moore, 1987, Draft Bunker Hill RI/FS Overall Field Operating Plan; Document No. 15852/PD034, 86 p.
- Freeze, Allan R., and Cherry, John A., 1979, Groundwater: Prentice-Hall, Inc., Englewood Cliffs, N.J., 604 p.
- McCulley, Frick & Gilman, Inc., 1992a, Bunker Hill Superfund Site RI/FS Technical Memorandum: Water Well Inventory and Well Closure; Prepared for ASARCO Incorporated, Callahan Mining Company, Coeur d'Alene Mines Corporation, Hecla Mining Company, Stauffer Management Company, Sunshine Mining Company, Sunshine Precious Metals Company, Union Pacific railroad, Gulf USA Corporation, Pintlar Corporation, 25 p.
- McCulley, Frick & Gilman, Inc., 1992b, Bunker Hill Superfund Site, 1991 Ground-Water Monitoring Program; 1991 Annual Ground-Water Monitoring Report, Basic Data Report: Prepared for ASARCO Incorporated, Callahan Mining Company, Coeur d'Alene Mines Corporation, Hecla Mining Company, Stauffer Management Company, Sunshine Mining Company, Sunshine Precious Metals Company, Union Pacific railroad, Gulf USA Corporation, Pintlar Corporation, 29 p.
- McCulley, Frick & Gilman, Inc., 1992c, Bunker Hill Superfund Site, Upper and Lower Zone Potentiometric Surface Maps, First Quarter, 1992: Prepared for ASARCO Incorporated, Callahan Mining Company, Coeur d'Alene Mines Corporation, Hecla Mining Company, Stauffer Management Company, Sunshine Mining Company, Sunshine Precious Metals Company, Union Pacific railroad, Gulf USA Corporation, Pintlar Corporation, 9 p.
- Pintlar Corporation, 1991, Water Source Survey Report; Unpublished, Dated March 26, 1991.
- State of Idaho Department of Water Resources, 1989, Rules and Regulations, Well Construction Standards, 30 p.

# APPENDIX A WELL INVENTORY AND CLOSURE INFORMATION

# TABLE A-1. DOMESTIC WELL CLOSURE REASSESSMENT

Number Figure		Document Source	Document Source Number	Water Source Type	Ownership/Address	Phone Number	Hole Diameter (inches)	Hole Depth (feet)	Casing Diameter (inches)	Casing Depth (feet)
1	Y	Pintlar Dames & Moore	<b>A</b> 1	Well	Stein Bros. Inc. P.O. Box 165 Kellogg, ID 83837	NA	NA	18	NA	NA ,
2	· N	Pintlar  Dames & Moore	None 4	Well	J. Perjue 458 RR Ave. Kellogg, ID 83837	. NA	. 8	250	6	250
3	Y	Pintlar Dames & Moore	88 6	Well	Stein Bros. Inc. P.O. Box 165 Kellogg, ID 83837	208 – 784 – 1122	8	65	6	64
4	P	Dames & Moore	7	Well	NA	NA	NA	NA	NA	NA
5	Y	Dames & Moore	15	Well	C. Copeland P.O. Box 1201 Wallace, ID. 83873	NA	6	177	6	22
6	N	Pintlar Dames & Moore	84 16	Well	State of Idaho Dept. of Highway P.O. Box D Coeur D'Alene, ID 83814	NA	NA	NA	NA	NA
/ 7	N	Pintlar Dames & Moore	92 17	Well	City of Kellogg 323 Main Street Kellogg, ID 83837	208-784-5595	NA	NA .	NA	NA
8	Y	Dames & Moore	18	Well	Greenwood Cemetary	NA.	NA	NA	NA	NA

TABLE A-1. DOMESTIC WELL CLOSURE REASSESSMENT (continued)

Number on Figure 1	Screen Interval (feet)	Probable Completion Zone	Lit. Search	Field Ck. RI	Field Ck. Pintlar	Closure Required	Comments
1	NA :	ប	Y	N	N	N	Dry well for storm water
2	210-250 ·	В	Y	<b>N</b> .	N	N	Well destroyed after BH bought property
3	56-64	L	Y	N	Y	Y	Secondary water supply Garden Spot IGA Contact Chuck Stein
4	NA ·	NA.	Y	· N	N	N	No Location
5	19-22	NA	Y.	N	N	N	Located in Montgomery Gulch
6	NA	NA	Y	<b>N</b> .	N	, <b>P</b>	Well used for irrigation Maintained by the City of Kellogg Contact Gary Timby
7	NA	U	Y	N	Y	P	Well used for irrigation at Greenwood Cemetery
8	NA	NA	Y	N	N	N	No wells located on cemetery property

TABLE A-1. DOMESTIC WELL CLOSURE REASSESSMENT (continued)

Number on Figure 1	Located in Area I?	Document Source	Document Source Number	Water Source Type	Ownership/Address	Phone Number	Hole Diameter (inches)	Hole Depth (feet)	Casing Diameter (inches)	Casing Depth (feet)
9	Y	Dames & Moore	19	Well	G.Gunderson Wardner, ID 83873	NA	6	50	6	47
10	Y	Pintlar Dames & Moore	82 20	Well	H. McCreary 900 W. Cameron Ave. Kellogg, ID 83837	208-786-0591	NA	60	NA	60
. 11	Y	Dames & Moore	21	Well	R. Dalton PO Box 313 Osburn, ID 83849	NA	10	41	10	41
12	Y	Pintlar Dames & Moore	86 23	Well	Bud Deeder 7 Diamond Ave Kellogg, ID 83837	208-786-3071	8	74	6	74
	, .				Joe Curtis 404 Emerald Dr. Kellogg, ID 83837	208-786-0791				
13	Y	Pintlar Dames & Moore	85 24	Well	School Dist. 391 800 Bunker Ave. Kellogg, ID 83837	208-784-1348	NA	NA	NA	NA
/ 14	Y	Pintlar Dames & Moore	99 25	Well	Dante Bisaro 124 Cathryn Ave. Kellogg, ID 83837	208-783-5001	NA	41	NA	NA

TABLE A-1. DOMESTIC WELL CLOSURE REASSESSMENT (continued)

Number on Figure 1	Screen Interval (feet)	Probable Completion Zone	Lit. Search	Field Ck. RI	Field Ck. Pintlar	Closure Required	Comments
9	32-46	A	Y	N	N	N	Well has been destroyed and filled in
10	NA	L	Y	N	Y	Y	Water quality data available Domestic use
11	NA	A	Y	N	N	P	Well has been destroyed
12	64–74	L	Υ .	N	Υ .	P	Well used for irrigation Common use between owners
13	NA	U or L	Y	N	Y	P	Well usedfor irrigation
14	NA	Α	<b>Y</b>	N	N	P	Domestic Use

# TABLE A-1. DOMESTIC WELL CLOSURE REASSESSMENT (continued)

Number on Figure 1	Located in Area I?	Document Source	Document Source Number	Water Source Type	Ownership/Address	Phone Number	Hole Diameter (inches)	Hole Depth (feet)	Casing Diameter (inches)	Casing Depth (feet)
15	<b>Y</b>	Pintlar :	80	Well	James Keller Freeport Indonesia, Inc. P.O. Box 616 Cairns, Queensland 4870 Australia	NA	NA	NA	NA	NA .
16	Y	Pintlar	81	Spring	James Keller Freeport Indonesia, Inc. P.O. Box 616 Cairns, Queensland 4870 Australia	NA	NA	NA	60 X 96	5
17	Y	Pintlar	87	Well	Virgil McKenzie 204 Emerald Dr. Kellogg, ID 83837	208-784-6041	NA	NA	5	55
18	Y	Pintlar	90	Well	Richard Schrieber 409 Emerald Dr. Kellogg, ID 83837	208-784-6601	NA	NA	8	67
19	Y	Pintlar	91	Well	Joyce Chaffee 126 E. Mullan Kellogg, ID 83837	208-786-8581	NA	NA	NA	NA
20	Y	Pintlar	93	Spring	Gary Larsen P.O. Box 71 Kellogg, ID 83837	208 – 786 – 5981	NA	NA	48 X 72	4

TABLE A-1. DOMESTIC WELL CLOSURE REASSESSMENT (continued)

Number on Figure 1	Screen Interval (feet)	Probable Completion Zone	Lit. Search	Field Ck. RI	Field Ck. Pintlar	Closure Required	Comments
15	NA	B,U or L	N	N	Y	<b>Y</b>	Used for irrigation Spring on property for Domestic use (#16) Contact James Currie 208-682-3030
16	NA ·	S	N <sup>'</sup>	N	Y	N	Domestic use Well on property for irrigation (#15) Contact James Currie 208-682-3030
17	NA	L .	N	N	Y	P	Used for irrigation
18	NA	U	N	N	Y	Y	St. Vincent De Pall Store Commercial use
19	NA	υ	N	N	Y	P	Used for irrigation
20	NA	S	N	N	Y	N	Hillside spring Domestic use

TABLE A-1. DOMESTIC WELL CLOSURE REASSESSMENT (continued)

Number on Figure 1	Located in Area I?	Document Source	Document Source Number	Water Source Type	Ownership/Address	Phone Number	Hole Diameter (inches)	Hole Depth (feet)	Casing Diameter (inches)	Casing Depth (feet)
21	Y	Pintlar :	94	Spring	Lawrits Larsen P.O. Box 987 Kellogg, ID 83837	208-786-4491	NA	NA	24	5
22	N	Pintlar	95	Spring	Lawrits Larsen P.O. Box 987 Kellogg, ID 83837	208 – 786 – 4481	NA	NA	120 X 240	4
23	Y	Pintlar	96	Spring	Thomas Chambers P.O. Box 124 Kellogg, ID 83837	208-783-8341	NA	NA	48 X 48	10
24	N	Pintlar	98	Spring	Jerry Hallis P.O. Box 515 Osburn, ID 83849	208-753-6241	NA	NA	36	10
25	Y	Pintlar	100	Well	Fred Brackebusch HC01 Box 246 Kellogg, ID 83837	208-786-3611	NA	NA	8	85
26	Y	Pintlar	101	Well	Mike Derbyshire P.O. Box 944 Kellogg, ID 83837	208 – 786 – 4891	NA	NA	NA	30

TABLE A-1. DOMESTIC WELL CLOSURE REASSESSMENT (continued)

Number on Figure 1	Screen Interval (feet)	Probable Completion Zone	Lit. Search	Field Ck. RI	Field Ck. Pintlar	Closure Required	Comments
21	NA ;	S	N	N	Y	<b>N</b>	Hillside Spring Domestic use
22	ŅĀ	S	N	N	Y	N	Hillside Spring Domestic use Located 1500' south of house
23	NA	S	N	N	Y	N	Hillside Spring Domestic use
24	NA	S	N	N	Y	N	Hillside Spring Vacant property
25	NA	В	N	N	Y	N	Domestic use
26	NA	A or B	N	N	Y	N	Domestic use

TABLE A – 1. DOMESTIC WELL CLOSURE REASSESSMENT (continued)

Number on Figure 1	Located in Area I?	Document Source	Document Source Number	Water Source Type	Ownership/Address	Phone Number	Hole Diameter (inches)	Hole Depth (feet)	Casing Diameter (inches)	Casing Depth (feet)
27	Y	Pintlar	102	Well	Michell Appleberg P.O. Box 1013 Kellogg, ID 83837	208-786-2621	NA	NA	6	18
	·	;			Mildrad Payton P.O. Box 508 Kellogg, ID 83837	208-786-9002				
28	Y	Pintlar	103	Well	Gunard Appleberg P.O. Box 508 Kellogg, ID 83837	208-786-9001	NA	NA	6	18
29	Y	Pintlar	104	Well	John F. Beecher P.O. Box 649 Osburn, ID 83849	208-784-7401	NA	NA	NA	NA
30	Y	Pintlar	105	Well	Fred Barney P.O. Box 26 Osburn, ID 83849	208-786-5041	NA	NA	NA	NA
31	Y	Pintlar Dames & Moore	54 e 35	Well	Jerry Madsen Box 523 Smelterville, ID 83868	208-786-7621	6	64	6	64
32	Y	Pintlar Dames & Moore	55 e 36	Well	Fred Hasz HCO1 Box 217 Kellogg, ID 83837	208-786-0505	8	130	) 6	NA

TABLE A-1. DOMESTIC WELL CLOSURE REASSESSMENT (continued)

Number on Figure 1	Screen Interval (feet)	Probable Completion Zone	Lit. Search	Field Ck. RI	Field Ck. Pintlar	Closure Required	Comments
27	NA '	A or B	N	Ņ	Y	·N	Common well; 3 homes tied to 2 wells Well Owners: Mike Derbyshire Michell Appleberg Gunard Appleberg
28	NA	A or B	N	N	Υ .	N	Common well; 3 homes tied to 2 wells See # 27
29	NA	NA .	N .	N	Y	N	Domestic use
30	NA	NA	N .	N	Y	· N	Domestic use
31	NA	В	Y	N	Y	N	Domestic use
32	35-45	В	Y	N	Y	N	Domestic use

TABLE A-1. DOMESTIC WELL CLOSURE REASSESSMENT (continued)

Number on Figure 1	Located in Area I?	Document Source	Document Source Number	Water Source Type	Ownership/Address	Phone Number	Hole Diameter (inches)	Hole Depth (feet)	Casing Diameter (inches)	Casing Depth (feet)
33	Y	Pintlar Dames & Moore	66 48	Well	E. Siler P.O. Box 100 Smelterville, ID 83868	208 - 786 - 6551	6	86	4	<b>80</b> ·
34	Y	Pintlar Dames & Moore	65 49	Well	E. Siler P.O. Box 100 Smelterville, ID 83868	208 - 786 - 6551		78	6	80
35	Y	Pintlar Dames & Moore	57 54	Well	Brent Van Vleet 702 N. Howard Kellogg, ID 83837	208-784-0141	6	200	6	35
36	N	Pintlar Dames & Moore	.75 55	Well	J. Gilliland Box 65 Smelterville, ID 83868	208 - 786 - 1241	6	24	6	24
37	Y	Dames & Moore	56	Well	H. Watts Box 7 Smelterville, ID 83868	NA	6	33	6	29
38	N	Pintlar Dames & Moore	79 57	Well	Ed White Box 579 Smelterville, ID 83868	208-786-9551	6	230	6	21
39	Y	Pintlar Dames & Moore	77 58	Well	City of Smelterville Box 200 Smelterville, ID 83868	208-786-3351	NA	NA	4	95

TABLE A-1. DOMESTIC WELL CLOSURE REASSESSMENT (continued)

Number on Figure 1	Screen Interval (feet)	Probable Completion Zone	Lit. Search	Field Ck. RI	Field Ck. Pintlar	Closure Required	Comments
33	75-80 !	L	Y	N	Y	Y	Well not in use Located in scrap yard
34	75-80	L	Y	N	Y	Y	Domestic use
35	NA	U	Υ.	N .	Y	Y	Domestic use Boat Restaurant
36	18-24	บ .	Y	Y	Y	P	Used for irrigation
37	23-29	U	Y	N	N	<b>N</b>	Several holes placed, however, not able yo get to water Holes backfilled
38	NA	U	Y	N	Y	Y	Domestic use White's RV Park
39	NA	L	Y	N	Ÿ	P	Used for irrigation

TABLE A-1. DOMESTIC WELL CLOSURE REASSESSMENT (continued)

Number on Figure 1	Located in Area I?	Document Source	Document Source Number	Water Source Type	Ownership/Address	Phone Number	Hole Diameter (inches)	Hole Depth (feet)	Casing Diameter (inches)	Casing Depth (feet)
40	Y	Pintlar Dames & Moore	74 65	Well	Charles Atha Box 386 Smelterville, ID 83868	208-784-5171	6	28	6	22
41	Y	Dames & Moore	66	Well	W. Ward Box 56 Smelterville, ID	NA	6	43	6	39
42	Y	Pintlar	56	Spring	Jess Weniger P.O. Box 155 Smelterville, ID 83868	208-784-7501	NA	NA	48 X 96	5
43	Y	Pintlar Dames & Moore	58 50	Weil	Wallace/Colville Auto Freight 400 Sycamore Spokane, WA	509-535-2986	NA	NA	6	80
44	, · Y	Pintlar Dames & Moore	59 51	Well	Earl Siler P.O. Box 100 Smelterville, ID 83868	208-786-6551	NA .	. <b>NA</b>	6	80
45	· <b>Y</b>	Pintlar Dames & Moore	60 52	Well	Earl Siler P.O. Box 100 Smelterville, ID 83868	208 - 786 - 6551	. NA	NA	4	80
46	Y	Pintlar Dames & Moore	61 53	Well	Earl Siler P.O. Box 100 Smelterville, ID 83868	208-786-6551	, NA	NA	6	80

TABLE A-1. DOMESTIC WELL CLOSURE REASSESSMENT (continued)

Number on Figure 1	Screen Interval (feet)	Probable Completion Zone	Lit. Search	Field Ck. RI	Field Ck. Pintlar	Closure Required	Comments
40	18-22	U	Y	<b>N</b>	· <b>Y</b>	P	Used for irrigation
41	30-39	U	Y	N	N	N	Well was dry; backfilled
42	NA	S	N	N	Υ .	N	Domestic use
43	NA	L.	Y	Y	Y	Y	Domestic use
. 44	NA	Ĺ	Y	Y	Y	Y	Domestic use
45	NA	L .	Y	Y	Y	Υ .	Domestic use
46	NA	L	Y	Y	Y	<b>Y</b>	Vacant lot Well is not in use

TABLE A-1. DOMESTIC WELL CLOSURE REASSESSMENT (continued)

Number on Figure 1	Located in Area I?	Document Source	Document Source Number	Water Source Type	Ownership/Address	Phone Number	Hole Diameter (inches)	Hole Depth (feet)	Casing Diameter (inches)	Casing Depth (feet)
47	Y	Pintlar :	62	Well	Roy Nickerson P.O. Box 519 Smelterville, ID 83868	208-682-2651	NA	NA	6	59
48	Y	Pintlar	63	Well	Mark Dane 3907 Belmont Coeur d'Alene, ID 83814	208-682-2651	NA	NA	NA	NA
49	Y	Pintlar	64	Well	Earl Siler P.O. Box 100 Smelterville, ID 83868	208-786-6551	NA	· NA	6	80
50	Y	Pintlar	6.7	Well	Bud Elston P.O. Box 52 Smelterville, ID 83868	NA	NA	NA	6	13
51	Y	Pintlar	68	Well	Albert Reed P.O. Box 30 Smelterville, ID 83868	208 - 786 - 6252	NA	NA	6	26
52 :	Y	Pintlar	69	Well	Bennie Bachmeier P.O. Box 183 Smelterville, ID 83868	208-786-6691	NA	. NA	6	26
53	Y	Pintlar	70	Well	Marie C. Cowen P.O. Box 265 Silverton, ID 83867	208 – 752 - 8741	NA	NA	6	25

TABLE A-1. DOMESTIC WELL CLOSURE REASSESSMENT (continued)

	umber on Figure 1	Screen Interval (feet)	Probable Completion Zone	Lit. Search	Field Ck. RI	Field Ck. Pintlar	Closure Required	Comments
	47	NA .'	L	N	N	Y	Y	Domestic use
	48	NA	U or L	N	N	Ÿ	Y	Domestic use
	49	NA	L	N	N	Y	P	Used for irrigation
	50	NA	U .	N	N	Y	Y	Well not used
•	51	NA	U	N	N .	Y	Y	Well not used Reed's Motel
,	52	NA	U	<b>N</b>	N	Y	P	Used for irrigation
	53	NA	U	N	N	Y	Y	Well not used

TABLE A-1. DOMESTIC WELL CLOSURE REASSESSMENT (continued)

Number on Figure 1	Located in Area I?	Document Source	Document Source Number	Water Source Type	Ownership/Address	Phone Number	Hole Diameter (inches)	Hole Depth (feet)	Casing Diameter (inches)	Casing Depth (feet)
54	Υ	Pintlar	71	Well	Roy Nickerson P.O. Box 519 Smelterville, ID 83868	208-682-2651	NA	NA	6	58
55	Y	Pintlar	73	Well	James Foley P.O. Box 117 Smelterville, ID 83868	208-784-7061	NA	NA	6	26
56	Y	Pintlar	78	Well	Bennie Bachmeier P.O. Box 183 Smelterville, ID 83868	208-786-6691	NA	NA	6	55
. 57	Y	Pintlar	37	Well	Sam Whitaker P.O. Box 238 Smelterville, ID 83868	208-682-3171	NA	NA	NA	NA
			•	Well	Clarence Wentz N/A Smelterville, ID 83868	208-682-3937				
58 :	Y	Pintlar	38	Well	Jon Hagaman P.O. Box 249 Smelterville, ID 83868	208-784-4791	NA	NA	24	14
59	Y	Pintlar	39	Well	Gerald Furnish P.O. Box 594 Smelterville, ID 83868	208-784-4791	NA	NA	NA	19

TABLE A-1. DOMESTIC WELL CLOSURE REASSESSMENT (continued)

Number on Figure 1	Screen Interval (feet)	Probable Completion Zone	Lit. Search	Field Ck. RI	Field Ck. Pintlar	Closure Required	Comments
54	NA :	L	N	N	Y	Y	Vacant lot west of Nickerson's Car Agency; Water pumped across street to Car Agency for commercial use
55	NA	U	N	N	Y	P	Used for irrigation
56	NA	L	N	N	Y	P	Used for irrigation
57	NA	A or B	N	N	Y	N	Domestic use Common well with Clarence Wentz
58	NA	Α	<b>N</b> .	N	Y	P	Domestic use
. 59	NA	Α	N	N	Y	P	Domestic use Hand dug

TABLE A-1. DOMESTIC WELL CLOSURE REASSESSMENT (continued)

Number on Figure 1	Located in Area I?	Document Source	Document Source Number	Water Source Type	Ownership/Address	Phone Number	Hole Diameter (inches)	Hole Depth (feet)	Casing Diameter (inches)	Casing Depth (feet)
60	Y	Pintlar ;	40	Well	Eva Battista P.O. Box 308 Smelterville, ID 83868	208 – 786 – 4621	NA	NA	6	60
61	Y	Pintlar	41	Well	Ernie Abey P.O. Box 72 Kellogg, ID 83837	NA	NA	NA	NA	NA
62	Y	Pintlar	42	Well	William Riegle P.O. Box 1251 Pinehurst, ID 83850	208-783-4261	NA	NA	6	320
63	Y	Pintlar	43	Well	Marvin Benjamin P.O. Box 399 Smelterville, ID 83868	208-784-0321	NA	NA	4	50
64	Y	Pintlar	44	Spring	Elmer Kauppi P.O. Box 704 Kellogg, ID 83837	208 – 784 – 5693	NA	NA	Вох	5
; ·					Leonard George P.O. Box 412 Smelterville, ID 83868	208-784-5692				
65	Y	Pintlar	45	Well	Cathy Fretheim P.O. Box 346 Smelterville, ID 83868	208-784-8001	NA	NA	. 5	NA

TABLE A-1. DOMESTIC WELL CLOSURE REASSESSMENT (continued)

Number on Figure 1	Screen Interval (feet)	Probable Completion Zone	Lit. Search	Field Ck. RI	Field Ck. Pintlar	Closure Required	Comments
60	<b>NA</b> !	<b>B</b> -	N	N	Y	P	Domestic use
61	NA ·	A or B	N	N	Υ.	P	Domestic use
62	NA	В	N	N	Y	P	Domestic use
63	NA	В	N	N	Y	P	Domestic use Common well with neighbors (fire protection)
64	NA	S	N	N	Y	N	Domestic use Lined with concrete blocks Common use with Leonard George
65	NA	A or B	N	· N	. <b>Y</b>	p	Domestic use

TABLE A-1. DOMESTIC WELL CLOSURE REASSESSMENT (continued)

Number on Figure 1	Located in Area I?	Document Source	Document Source Number	Water Source Type	Ownership/Address	Phone Number	Hole Diameter (inches)	Hole Depth (feet)	Casing Diameter (inches)	Casing Depth (feet)
66	<b>Y</b>	Pintlar : :	46	Well	Maiting Hansen P.O. Box 4 Kellogg, ID 83837	208-784-0321	NA	NA	NA	NA ,
67	Y	Pintlar ·	47	Well	Reed Block P.O. Box 197 Smelterville, ID 83868	208-786-6792	NA	NA	4	65
68	Y	Pintlar	48	Well	Joyce Valerio P.O. Box 61 Kingston, ID 83839	NA	NA	NA	5	50
69	Y	Pintlar	49	Well	Oliver Silvfast P.O. Box 605 Smelterville, ID 83868	208-784-6333	NA	NA	5	42
<b>70</b>	Y	Pintlar	50	Well	Martha Fryer P.O. Box 215 Smelterville, ID 83868	208-784-0891	NA	NA	NA	32
71:	Y	Pintlar	51	Well	June Roe P.O. Box 507 Smelterville, ID 83868	208-786-3155	NA	NA	6	36
72	Y	Pintlar	52	Well	Dean Broders P.O. Box 4561 Coeur d'Alene, ID 83814	208-784-5101	NA	NA	NA	NA

TABLE A-1. DOMESTIC WELL CLOSURE REASSESSMENT (continued)

Number on Figure 1	Screen Interval (feet)	Probable Completion Zone	Lit. Search	Field Ck. RI	Field Ck. Pintlar	Closure Required	Comments
66	NA	A or B	N	N	Y	P	Domestic use
67	ŅĀ	В	N	N	, Y	<sub>.</sub> P	Domestic use
68	NA	В	N	N	Y	P	Domestic use
69	NA	В.	N	N	Y	P	Domestic use
70	NA	A or B	N	N	Y	P	Well not in use
71	NA	A or B	N .	N	<b>Y</b>	P	Domestic use
72	NA	A or B	. N	N	Y	P	Domestic use

TABLE A-1. DOMESTIC WELL CLOSURE REASSESSMENT (continued)

Number on Figure 1	Located in Area I?	Document Source	Document Source Number	Water Source Type	Ownership/Address	Phone Number	Hole Diameter (inches)	Hole Depth (feet)	Casing Diameter (inches)	Casing Depth (feet)
73	Y	Pintlar	53	Well	Joseph Allen P.O. Box 125 Kellogg, ID 83837	208-783-9061 208-784-8721	NA	NA	NA	NA ,
74	N	Dames & Moore	2	Well	G. Appelberg P.O. Box 580 Kellogg, ID 83837	NA	NA	NA	NA	NA
75	Y	Pintlar Dames & Moore	34 5	Well	Randy Simmons P.O. Box 593 Pinehurst, ID 83850	NA	NA	NA	NA	NA
76	Y	Pintlar Dames & Moore	16 38	Well	Dorothy Frey Box 388 Smelterville, ID 83868	208-682-2594	8	300	4	300
77	N	Dames & Moore	39	Well	F. Brown Box 238 Osburn, ID 83849	NA	. 8	225	6	187
78	N	Dames & Moore	40	Well	Russel Dalton P.O. Box 313 Osburn, ID 83849	NA		96	. 8	94.5
, 79	N	Dames & Moore	41	Well	M. Lein Fairway Heights Pinehurst, ID 83850	NA .	6	83	6	81

TABLE A-1. DOMESTIC WELL CLOSURE REASSESSMENT (continued)

Number on Figure 1	Screen Interval (feet)	Probable Completion Zone	Lit. Search	Field Ck. RI	Field Ck. Pintlar	Closure Required	Comments
73	<b>NA</b> 	A or B	N	N	Y	P	Domestic use
74	NA	A or B	Y	N	N	N	JBB spoke to Appleberg 3-16-90 No knowledge of well
75	NA	A or B	Y	N	Y	N	Domestic use
76	280-300	В	Y	N	Y	N	Domestic use
77	NA	В	<b>. Y</b> .	N	Y	P	Unable to locate owner or well
78	89-94	A or B	Y	N	Y	<b>p</b> .	JBB talked to R. Dalton 3-21-90; Unaware of well; drill log on file
79	28-78	A or B	Y	N	Y	P	M.Lien moved out of district; JBB unable to locate

TABLE A-1. DOMESTIC WELL CLOSURE REASSESSMENT (continued)

Number on Figure 1	Located in Area I?	Document Source	Document Source Number	Water Source Type	Ownership/Address	Phone Number	Hole Diameter (inches)	Hole Depth (feet)	Casing Diameter (inches)	Casing Depth (feet)
80	Y	Pintlar Dames & Moore	29 42	Well	Dora Garner HCO1 Box 29 Pinehurst, ID 83850	208-682-2511 208-682-3212	10	95	8	95
81	<b>N</b>	Dames & Moore	43	Well	R.Shutt NA	NA	NA	107	6	104
82	Y	Pintlar Dames & Moore	27 44	Well	Scott Shiplett Box 905 Pinehurst, ID 83850	208 - 682 - 2431 208 - 682 - 2734	6	97	6	97
83	. <b>N</b>	Dames & Moore	45	Well	Tibubon 2034 E. 3rd Street Coeur d'Alene, ID 83814	NA	12	100	12	99
84	Y	Pintlar Dames & Moore	30 46	Well	William McBaine Box 644 Osburn, ID 83849	208-753-9355	10	98	10	98
85	N	Pintlar	1	Well	Kellogg Transfer Inc. Raymond Radford P.O. Box 70 Kingston, ID 83839	208-682-2124	NA .	NA	8	36
86	. <b>N</b>	Pintlar	2	Well	Greg Blake HC01 Box 251 Kingston, ID 83839	208-682-4257	NA	NA	8	150

TABLE A-1. DOMESTIC WELL CLOSURE REASSESSMENT (continued)

Number on Figure 1	Screen Interval (feet)	Probable Completion Zone	Lit. Search	Field Ck. RI	Field Ck. Pintlar	Closure Required	Comments
80	85-95	A or B	Y	N	Υ.	P	Domestic & commercial use Water used for Pinehurst Laundromat & drinking
81	NA	A or B	Y	N	Y	P	JBB unable to locate owner
82	NA	A or B	<b>Y</b>	N .	Y	P	Domestic & commercial use Shiplett's Chevron Station
83	NA	A or B	Y	N	Y	P	JBB unable to locate owner
84	81-94	A or B	Y	N ·	Y	P	Unused commercial well; capped
85	NA	A or B	N	<b>N</b> .	Y	N	Domestic & industrial use Water tested by SVL
86	NA	A or B	N	N	У	N	Domestic use

TABLE A-1. DOMESTIC WELL CLOSURE REASSESSMENT (continued)

Number on Figure 1	Located in Area I?	Document Source	Document Source Number	Water Source Type	Ownership/Address	Phone Number	Hole Diameter (inches)	Hole Depth (feet)	Casing Diameter (inches)	Casing Depth (feet)
87	N	Pintlar Dames & Moore	3 22	Well	Russell Dalton P.O. Box 313 Osburn, ID 83849	208-556-2973	NA	NA	8	96
88	Y	Pintlar	4	Well	Pearl Wright P.O. Box 636 Pinehurst, ID 83850	208-682-3350	NA	NA	NA	NA
89	Y	Pintlar	5	Well	Mrs. Harry Hagaman P.O. Box 221 Pinehurst, ID 83850	208-682-2346	NA	NA	NA	NA
90	Y	Pintlar	6	Well	Glen Nickerson P.O. Box 830 Pinchurst, ID 83850	208-682-2022	NA	NA	NA	NA
91	Υ	Pintlar	7	Well	Shirley Spoor P.O. Box 691 Pinehurst, ID 83850	208-682-2222	NA	NA	NA	NA
92	Y	Pintlar	8	Well	Robert Caldwell P.O. Box 882 Pinehurst, ID 83850	208-682-2330	NA	NA	6	<b>75</b>
/ 93	Y	Pintlar	9	Well	Bruce Larson Box 413 Pinehurst, ID 83850	208-682-3058	NA.	NA	3	100

TABLE A-1. DOMESTIC WELL CLOSURE REASSESSMENT (continued)

Number on Figure 1	Screen Interval (feet)	Probable Completion Zone	Lit. Search	Field Ck. RI	Field Ck. Pintlar	Closure Required	Comments
87	NA	A or B	Y	Y	Y	P	Well not in use
88	NA	A or B	N	N	Υ	P	Domestic use
89	NA	A or B	N	N .	Y	P	Domestic use
90	NA	A or B	N	N	Y	P	Well not in use
91	NA	A or B	N	N	Y	P	Domestic use
92	NA	A or B	N	N	Y	P	Domestic use
93	NA	A or B	`N	N	Y	P	Domestic use

TABLE A-1. DOMESTIC WELL CLOSURE REASSESSMENT (continued)

Number on Figure 1	Located in Area I?	Document Source	Document Source Number	Water Source Type	Ownership/Address	Phone Number	Hole Diameter (inches)	Hole Depth (feet)	Casing Diametor (inches)	Casing Depth (feet)
94	Y	Pintlar	10	Well	Quill McBrien P.O. Box 481 Pinchurst, ID 83850	208-682-3631	NA	NA	4	96
95	Y	Pintlar	11 ·	Well	Harry Winkler P.O. Box 632 Pinehurst, ID 83850	208-682-2459	NA ·	NA	6	97
96	Y	Pintlar .	12	Well	Clarence E. Carlson HC01 Box 08 Pinehurst, ID 83850	208-682-4155	NA	NA	4	30
97	Y	Pintlar	13	Well	Terance Gosline Gosline Trailer Court Pinehurst, ID 83850	208-682-2451	NA	NA	NA	NA
98	Y	Pintlar	14	Well	William McLeod HC01 Box 20 Pinehurst, ID 83850	208-682-3220	NA	NA	3	35
99	Y	Pintlar	15	Spring	Edith Lahde P.O. Box 91 Smelterville, ID 83868	208-682-2593	NA	NA	NA	NA
100	Y	Pintlar	17	Well	Margie Wilmey P.O. Box 484 Pinehurst, ID 83850	208-682-2053	NA	NA	NA ·	NA

TABLE A-1. DOMESTIC WELL CLOSURE REASSESSMENT (continued)

Number on Figure 1	Screen Interval (feet)	Probable Completion Zone	Lit. Search	Field Ck. RI	Field Ck. Pintlar	Closure Required	Comments
94	<b>NA</b> :	A or B	N	N	Y	P	Domestic use
95	ŅĀ	A or B	N	N	Y	P	Domestic use
96	NA	A	N	N	Y	P	Domestic use
97	NA	A or B	N	N	Y	P	Well not in use
98	NA	A or B	N	N	Y	þ	Domestic use
99	NA	S	Y	Y	Y	N	Domestic use
100	NA	В	N	N	Y	P	Domestic use

TABLE A-1. DOMESTIC WELL CLOSURE REASSESSMENT (continued)

Number on Figure 1	Located in Area I?	Document Source	Document Source Number	Water Source Type	Ownership/Address	Phone Number	Hole Diameter (inches)	Hole Depth (feet)	Casing Diameter (inches)	Casing Depth (feet)
101	Y	Pintlar	18	Well	Dwight Clift P.O. Box 482 Pinehurst, ID 83850	208-682-2591	NA	NA	NA	NA .
102	Y	Pintlar	19	Well	Earl J. Allman P.O. Box 182 Pinehurst, ID 83850	208-682-3336	NA	NA	NA	NA
103	Y	Pintlar	20	Well	Earl J. Allman P.O. Box 182 Pinehurst, ID 83850	208-682-3336	NA	NA	NA	NA
104	Y	Pintlar	21	Well	Earl J. Allman P.O. Box 182 Pinehurst, ID 83850	208-682-3336	NA	NA	NA	NA
105	Y	Pintlar	22	Well	Earl J. Allman P.O. Box 182 Pinehurst, ID 83850	208-682-3336	NA	NA	NA	NA
106	Y	Pintlar	23	Well	Janet McEnany P.O. Box 770 Pinehurst, ID 83850	208-682-3819	NA	NA	NA	NA
107	Y	Piņtlar	24	Well	Charles Carver P.O. Box 153 Pinehurst, ID 83850	208-682-2731	NA	NA	NA	NA

TABLE A-1. DOMESTIC WELL CLOSURE REASSESSMENT (continued)

Number on Figure 1	Screen Interval (feet)	Probable Completion Zone	Lit. Search	Field Ck. RI	Field Ck. Pintlar	Closure Required	Comments	
101	<b>NA</b> :	A or B	N	N	Y	P	Domestic use Add tie—in to 2" line from well #100	
102	NA	A or B	N	N	Y	P	Domestic use	
103	NA	A or B	N	N	Y	<b>P</b> .	Domestic use	
104	NA	A or B	N .	N	Υ .	P	Well not in use Well has never been used	
105	NA	A or B	N	N	Y	P	Domestic use Well services six houses	
106	NA	A or B	N	N	Y	P	Domestic use	
107	NA	A or B	N	N	Y	P	Domestic use	

TABLE A-1. DOMESTIC WELL CLOSURE REASSESSMENT (continued)

Number on Figure 1	Located in Area I?	Document Source	Document Source Number	Water Source Type	Ownership/Address	Phone Number	Hole Diameter (inches)	Hole Depth (feet)	Casing Diameter (inches)	Casing Depth (feet)
108	Y	Pintlar	25	Well	Ron Morton P.O. Box 977 Pinehurst, ID 83850	208-682-2070 208-682-2950	NA ·	NA	NA	NA .
109	Y	Pintlar	26	Well	Arnie Wick P.O. Box 222 Pinehurst, ID 83850	208-682-2156	NA	NA	12	15
110	Y	Pintlar	31	Well	William McBaine P.O. Box 644 Osburn, ID 83849	208-753-9355	NA	NA	10	100
111	Y	Pintlar	32	Well	Evert Arvidson P.O. Box 336 Pinehurst, ID 83850	208-682-2612	NA	NA	5	100
112	Y	Pintlar	33	Well	Sherman Watts P.O. Box 150 Pinehurst, ID 83850	208-682-2153	NA	NA	NA	NA
113	Y	Pintlar	35	Well	Helvie Sinnemaki P.O. Box 662 Pinehurst, ID 83850	203-682-2627	NA	NA	NA	NA
					Mrs. George Wilson P.O. Box 552 Pinehurst, ID 83850	208-682-2628				

TABLE A-1. DOMESTIC WELL CLOSURE REASSESSMENT (continued)

Number on Figure 1	Screen Interval (feet)	Probable Completion Zone	Lit. Search	Field Ck. RI	Field Ck. Pintlar	Closure Required	Comments
108	NA	A or B	N	N	Y	Р .	Domestic use
109	NA	Α	N	N	Y.	P	Domestic use
110	NA	A or B	N	N	Y	P	8" pipe added on to well #84
111	NA	A or B	N	N	Y	P	Domestic use Evert's Electric Center
112	NA	A or B	N	N	Y	P	Well not used Watt's Electric
113	NA	A or B	N	N	Y	<b>N</b> .	Domestic use Common well with Wilson

# TABLE A-1. DOMESTIC WELL CLOSURE REASSESSMENT (continued)

Number on Figure 1	Located in Area I?	Document Source	Document Source Number	Water Source Type	Ownership/Address	Phone Number	Hole Diameter (inches)	Hole Depth (feet)	Casing Diameter (inches)	Casing Depth (feet)
114	Y	Pintlar	36	Well	Helvie Sinnemaki P.O. Box 662 Pinehurst, ID 83850	208-682-2627	NA	NA	NĄ	NA ,

# TABLE A-1. DOMESTIC WELL CLOSURE REASSESSMENT (continued)

Number on	Screen Interval	Probable Completion	Lit.	Field Ck.	Field Ck.	Closure	
Figure 1	(feet)	Zone	Search	RI	Pintlar	Required	Comments
114	NA	A or B	N	N	Y	N	On the same property as well #113

#### Notes:

CSCWD = Central Shoshone County Water District	A = Alluvium
SCWC = Silver Creek Water Company	B = Bedrock
PWD = Pinehurst Water District	S = Spring
BH = Bunker Hill	U = Upper Zone
NA = Data Not Available	L = Lower Zone
Dames & Moore = (Dames & Moore, 1989) See Reference	C = Confining Zone
Pintlar = (Pintlar, 1991) See Reference	Y = Yes
Bunker Hill Files = (BLP Files) See Reference	N = No
, ,	P = Possibly

TABLE A-2. DOMESTIC WELL CLOSURE DATA

Number on Figure 1	Located in Area I?	Hole Diameter (inches)	Hole Depth (feet)	Casing Diameter (inches)	Casing Depth (feet)	Screen Interval (feet)	Probable Completion Zone	Leakage Status*	Location Relative To Central Valley Constriction
1	<b>Y</b> :	NA	18	NA	NA	NA	U	NL	
2	N,	8	250	6	250	210-250	В	NL	
3	Y	8	65	6	64	56-64	L	PL	Е
4 ·	NA	NA	NA	NA	NA	NA	NA	NL	
5	Y	6	177	6	22	19-22	NA	NL	
6	N	NA	NA	NA	NA	NA	NA	PL	E
7	N	NA	NA	NA	NA	NA	U	NL	
8	Y	NA	NA	NA	NA	NA	NA	NL	
9	Y	6	50	6	47	32 - 46	Α	NL	
10	Y	NA	60	NA	60	NA	Ľ	PL	E
11	Y	· 10	41	10	41	NA	Α	NL	
12	Y	8	74	6	74	64 - 74	L	PL	E
13	Y	NA	NA	NA	NA	NA	U or L	PL	E
14	Y	NA	41	NA	NA	NA	Α	NL	
15	Y	NA	NA	NA	NA	NA	B,U or L	PL	E
16	Y	NA	NA	60 X 96	5	NA	S	NL	
17	Y	NA	NA	5	55	NA	L	PL	E
18	Y	NA	NA	8	67	NA	U	NL	
· 19	Y	NA	NA	NA	NA	NA	U	NL :	
20	Y	NA	· NA	48 X 72	4	NA	S	NL	
21	Y	NA	NA	24	5	NA	S	NL	
22	N	NA	NA	120 X 240	. 4	NA	S	NL	
23	Y	NA	NA	48 X 48	10	`NA	S	NL	
24	N	NA	NA	36	10	NA	S	NL	
25	Y	NA	NA	8	85	NA	В	NL	
26	Y	NA	NA	NA	30	NA	A or B	NL	
27	Y	NA	NA	6	18	NA	A or B	NL	

TABLE A-2. DOMESTIC WELL CLOSURE DATA (continued)

Number on Figure 1	Closure Required	Minimum Material Volume (cu ft)	Maximum Material Volume (cu ft)	Alternate Water Source	Tie – In Pipe Diameter (inches)	Minimum Tie-In Pipe Length (feet)	Maximum Tie-In Pipe Length (feet)
4	, , , , , , , , , , , , , , , , , , ,	Managar garanta and a second	a are the sense area	THE TAX SERVICES	Emperation and States		
1	N N			NA NA			
2	N Y	10.4	10.6	CSCWD			
3	N .	12.4	12.6	NA NA			
4 5	N N			NA NA			
6	P	0.0	15.7	N N	NA	NA	NA
7	r P	0.0	7.8	N N	Philippi January and Assistance	0	F. 4000 2400 200 July 50 2400 11
	N	- U.U	1.0	NA NA	4	U	60
8 9	N N			NA NA			
10	Y	11.0	11.0	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1		780	780
	r P	11.8 0.0	11.8 22.4	N NA	6 NA	780 0	(
11				PAYON 802 1 1 1100 N. C.	NA NA		NA NA
12	P	0.0	14.5	CSCWD	NA NA	NA NA	NA NA
13	P	0.0	15.7	CSCWD	NA .	NA O	NA
14	P	0.0	7.8	N	6	0	2000
15	Y	7.8	15.7	N	6	440	440
.16 ·	N			N	.,,	.,,	N. T. A.
17	P	0.0	7.5	CSCWD	NA	NA NA	NA
18	Y	23.4	23.4	CSCWD	NA	NA NA	NA
19	P	0.0	7.8	CSCWD	NA	NA NA	NA
20	N			N			
21	N			N			
22	N			N			
23	N			N			
24	N			N			
25	N			N			
26	N			N			
. 27	N			N			

TABLE A-2. DOMESTIC WELL CLOSURE DATA (continued)

Number on Figure 1	Located in Area I?	Hole Diameter (inches)	Hole Depth (feet)	Casing Diameter (inches)	Casing Depth (feet)	Screen Interval (feet)	Probable Completion Zone	Leakage Status*	Location Relative To Central Valley Constriction
28	Y :	NA	NA	6	18	NA	A or B	NL	
29	Ϋ́	NA	NA .	NA	NA NA	NA	NA	NL	
30	Y	NA	NA	NA	NA	NA	NA	NL NL	
31	Y	6	64	6	64	NA	В	NL	
32	Ϋ́	8	130	. 6	NA NA	35-45	В	NL.	
33	Ÿ	6	86	4	80	75-80	Ĺ	PL	w
34	Ÿ	6 -	78	6	80	75-80	L	PL	w
35	Y	6	200	6		NA	บ	NL	
36	N	6	24	6	24	18-24	Ū	NL	
37	Y	6	33	6	29	23-29	Ū	NL	
38	N	6	230	6	21	NA	U	NL	
39	Y	NA	NA	. 4	95	NA	L	PL	W
40	Y	6	28	6	22	18-22	U	NL	
41	Y	6	43	6	. 39	30-39	U	NL	
42	Y	NA	NA	48 X 96	5	NA	S	NL	
43	Y	NA	NA	6	80	NA	L	PL	W
44	Y	NA	NA	6 -	80	NA	L	PL	W
45	Y	NA	NA	4	80	NA	L	PL	W
46	· <b>Y</b>	NA	NA	6	80	NA	L	PL	W
47	Y	NA	NA	6	59	NA	L	PL	W
48	Y	NA	NA	NA	NA	NA	U or L	PL	W
49	Y	NA	NA	· 6	80	NA	L	PL	W
50	Y	NA	NA	6	13	NA	U	NL	
51	Y	NA	NA	6	26	NA	U	NL	
52	Y	NA	NA	6	26	NA	U	NL	
53	Y	NA ·	NA	6	25	NA	U	NL	
54	Y	NA	NA	6	58	NA	L	PL	W

TABLE A-2. DOMESTIC WELL CLOSURE DATA (continued)

Number on Figure 1	Closure Required	Minimum Material Volume (cu ft)	Maximum Material Volume (cu ft)	Alternate Water Source	Tie-In Pipe Diameter (inches)	Minimum Tie-In Pipe Length (feet)	Maximum Tie-In Pipe Length (feet)
28	N			N			
29	N,			N			
30	N.			N			
31	N			N			
32	N			N			
33	Y	7.0	7.0	N	0.75	160	160
34	Y	15.7	15.7	N	0.75	85	85
35	Y	6.9	6.9	N	6	620	620
36	P	0.0	4.7	CSCWD	NA	NA	NA
37	N			NA			
38	Y	4.1	4.1	N	4	400	400.
39	P	0.0	8.2	CSCWD	NA	NA NA	NA
40	P	0.0	4.3	CSCWD	NA	NA NA	NA
41	N			NA			
42	N			N			
.43·	Y	15.7	15.7	N	0.75	125	125
44	Y	15.7	15.7	N	0.75	75	75
45 .	Y	7.0	7.0	N	0,75	130	130
· 46	Y	15.7	15.7	N	0.75	60	60
. 47	Y	11.6	11.6	N	0.75	80	80
48	Y	7.8	15.7	N	0.75	80	80
49	P	0.0	15.7	N	0.75	0	90
50	Y	2.5	2.5	CSCWD	NA	NA	NA
51	Y	5.1	5.1	CSCWD	NA	NA	NA
52	P	0.0	5.1	CSCWD	NA	NA	NA
53	. Y	4.9	4.9	CSCWD	NA	NA	NA
54	Y	11.4	11.4	N	6	470	470

TABLE A-2. DOMESTIC WELL CLOSURE DATA (continued)

Number on Figure 1	Located in Area I?	Hole Diameter (inches)	Hole Depth (feet)	Casing Diameter (inches)	Casing Depth (feet)	Screen Interval (feet)	Probable Completion Zone	Leakage Status*	Location Relative To Central Valley Constriction
55	Y	NA	NA	6	26	NA	U	NL	
56	· Y	NA	NA	6	55	NA	L	PL	W
57	Ϋ́	· NA	NA	.NA	NA	NA	A or B	NL	, ,
58	Y	NA	NA	24	14	NA	A	NL	
59	Ÿ	NA	NA	NA .	19	NA	A	NL	
60	Ŷ	NA.	NA	6	60	NA	В	NL	
61	Ÿ	NA	NA	NA	NA	NA	A or B	NL	
62	Ÿ	NA	NA	6	320	NA	В	NL	
63	Ϋ́	NA	NA	4	50	NA	В	NL	
64	Ŷ	NA	NA	Вох	5	NA	S	NL	
65	Ÿ	NA	NA	5	NA	NA	A or B	NL	
66	Ÿ	NA	NA	NA	NA	NA	A or B	NL	
67	Ÿ	NA	NA	4	65	NA	В	NL	
68	Y	NA	NA	5	50	NA	B	NL	
69	Ÿ	NA	NA	5	42	NA	В	NL	
70	Y	NA	NA	NA	32	NA	A or B	NL	
71	Ÿ	NA	NA	6	36	NA	A or B	NL	
72	Y	NA	NA	NA	NA	NA	A or B	NL	
73	Ÿ	NA	NA	NA	NA	NA	A or B	NL	
74	N	NA	NA	NA	NA	NA	A or B	NL	
75	Y	NA	NA	NA	NA	NA	A or B	NL	
76	Y	8	300	4	300	280-300	В	NL	
77	N	8	225	6	187	NA	В	NL	
78	N	. 8	96	8	94.5	89-94	A or B	NL	
.0 79	N	6	83	6	81	28-78	A or B	NL	
80	Y	10	95	8	95	85-95	A or B	NL.	
81	N	NA	107	6	104	NA	A or B	NL	

TABLE A-2. DOMESTIC WELL CLOSURE DATA (continued)

Number on Figure 1	Closure Required	Minimum Material Volume (cu ft)	Maximum Material Volume (cu ft)	Alternate Water Source	Tie-In Pipe Diameter (inches)	Minimum Tie-In Pipe Length (feet)	Maximum Tie-In Pipe Length (feet)
55	<b>P</b> :	0.0	5.1	CSCWD	l NA l	NA	NA
56	<b>P</b> :	0.0	10.8	CSCWD	NA NA	NA	NA
57	N.	*		N			
58	P	0.0	44.0	N	1.25	0	600
59	P	0.0	60.0	N	0.75	0	130
60	P	0.0	11.8	N	1	0	200
61	P	0.0	15.7	N	1	0	480
62	P	0.0	62.8	N	0,75	0	150
63	P	0.0	4.4	N	0.75	0	110
64	N			N			
65	P	0.0	10.9	N	0.75	0	100
66	P	0.0	15.7	N	0.75	0	110
67	P	0.0	5.7	N	0.75	0	115
68	P	0.0	6.8	N	0.75	0	90
69	P	0.0	5.7	N	0.75	0	80
.70 ·	P	0.0	6.3	SCWC	NA	0	NA
71	P	0.0	7.1	N	0.75	0	80
72	P	0.0	15.7	N	1	0	160
. 73	P	0.0	15.7	N	2	0	680
74	N			NA			
75	N			N			
76	N			NA			
77	P	0.0	36.7	NA	NA	0	NA
78	P	0.0	33.0	NA	NA	0	NA
<b>7</b> 9	P	0.0	15.9	NA	1	0	1900
80	P	0.0	33.2	N	2	0	100
81	P	0.0	20.4	NA	1	0	1900

TABLE A-2. DOMESTIC WELL CLOSURE DATA (continued)

Number on Figure 1	Located in Area I?	Hole Diameter (inches)	Hole Depth (feet)	Casing Diameter (inches)	Casing Depth (feet)	Screen Interval (feet)	Probable Completion Zone	Leakage Status*	Location Relative To Central Valley Constriction
82	Y	. 6	97	6	97	NA	A or B	NL	
83	N .	12	100	12	99	NA	A or B	NL NL	
84	Y	10	98	10	98	81-94	A or B	NL NL	
85	N	NA	NA	8	36	NA NA	A or B	NL NL	
86	N	NA	NA	8	150	NA	A or B	NL	
87	N	NA	NA	8	96	NA	A or B	NL	
88	Y	NA	NA	NA	NA	NA	A or B	NL	
89	Ÿ	NA	NA	NA	NA	NA	A or B	NL	
90	Ÿ	NA	NA	NA	NA	NA	A or B	NL	
91	Ÿ	NA	NA	NA	NA	NA	A or B	NL	
92	Y	NA	NA	6	75	NA	A or B	NL	
93	Y	NA	NA	3	100	NA	A or B	NL	
. 94	Y	NA	NA	4	96	NA	A or B	NL	
95	Y	NA	NA	6	- 97	NA	A or B	NL	
96	Y	NA	NA	• 4	30	NA	Α	NL	
97	Y	NA	NA	NA	NA	NA	A or B	NL	
98	Y	NA	NA	3	35	NA	A or B	NL	
99	Y	NA	NA	NA	NA ·	NA	S	NL	
. 100	Y	NA	NA	NA	NA	NA	В	NL	
101	Y	NA	NA	NA	NA	NA	A or B	NL	
102	Y	NA	NA	NA	NA	NA	A or B	NL	
103	Y	NA	NA	NA	NA	NA	A or B	NL	
104	Y	NA	NA	NA	NA	NA	A or B	NL	
105	Y	NA	NA	NA	NA	NA	A or B	NL	
106	Y	NA	NA	NA	NA	NA	A or B	NL	
107	Y	NA	NA	NA	NA	NA	A or B	NL	
108	Y	NA	NA	NA	NA	NA	A or B	NL	

TABLE A-2. DOMESTIC WELL CLOSURE DATA (continued)

Number on Figure 1	Closure Required	Minimum Material Volume (cu ft)	Maximum Material Volume (cu ft)	Alternate Water Source	Tie-In Pipe Diameter (inches)	Minimum Tie-In Pipe Length (feet)	Maximum Tie-In Pipe Length (feet)
82	P ·	0.0	19.0	N	1	0	90
83	$\mathbf{P}_{i}$	0.0	77.8	NA NA	1	0	100
84	P' . `	0.0	53.4	N	8	0	70
85	N	1	The Marketters	BH			
86	·N			N			
87	P	0.0	33.5	N	1	0	350
88	P	0.0	15.7	N	0.75	0	75
89	P	0.0	15.7	N	0.75	0	110
90	P	0.0	15.7	PWD	NA	0	NA
91	P	0.0	15.7	Ň	0.75	0	50
92	<b>P</b> .	0.0	14.7	N	1	0	275
93	Р.	0.0	4.9	N	0.75	0	100
94	P	0.0	8.4	N	0.75	0	60
95	P	0.0	19.0	N	0.75	0	75
96	P	0.0	2.6	N	1	0	285
.97	P	0.0	15.7	PWD	NA	0	NA
98	P	0.0	1.7	N	0.75	0	100
99	N			N			
100	P	0.0	15.7	N	2	0	606
101	P	0.0	15.7	N	1	0	150
102	P	0.0	15.7	N	0.75	0	50
103	P	0.0	15.7	N	0.75	0	110
104	P	0.0	15.7	N	1	0	100
105	P	0.0	15.7	N	0.75	0	155
106	P	0.0	15.7	N	0.75	0	65
107	P	0.0	15.7	N	2	0	75
108	P	0.0	15.7	N	2	0	75

# TABLE A-2. DOMESTIC WELL CLOSURE DATA (continued)

Number on Figure 1	Located in Area I?	Hole Diameter (inches)	Hole Depth (feet)	Casing Diameter (inches)	Casing Depth (feet)	Screen Interval (feet)	Probable Completion Zone	Leakage Status*	Location Relative To Central Valley Constriction
109	Y .	NA	NA	12	15	NA	Α	l nl	
110	Ϋ.	NA	NA	10	100	NA	A or B	NL	
111	Y	NA	NA	5	100	NA	A or B	NL	
112	Y	NA	NA	NA	NA	NA	A or B	NL	
113	Y	NA	NA	NA	NA	NA	A or B	NL	
114	Y	NA	NA	NA	NA	NA	A or B	NL	

TOTALS:

114

NL = 95	W = 12 E = 7
PD = 19	

## TABLE A-2. DOMESTIC WELL CLOSURE DATA (continued)

	Number on Figure 1	Closure Required	Minimum Material Volume (cu ft)	Maximum Material Volume (cu ft)	Alternate Water Source	Tie-In Pipe Diameter (inches)	Minimum Tie-In Pipe Length (feet)	Maximum Tie – In Pipe Length (feet)
	109 110 111 112 113 114	P P P P N	0.0 0.0 0.0 0.0	11.8 54.5 13.6 15.7	N N N PWD N N	1 8 2 NA	0 0 0	1130 170
TOTALS:	114	Y = 18 N = 33 P = 63	186 (cubic feet) 7 (cubic yards)	1334 (cubic feet) 49 (cubic yards)	N = 78 NA = 16 CSCWD = 15 SCWC = 1 PWD = 3 BH = 1		0.75" = 795 1.0" = 0 1.25" = 0 2.0" = 0 4.0" = 400 6.0" = 2710 8.0" = 0 NA = 15	0.75" = 2800 1.0" = 6100 1.25" = 600 2.0" = 1706 4.0" = 460 6.0" = 4710 8.0" = 1200 NA = 22

Notes:	NA = Data not available NL = Non-leaking well* PL = Potentially leaking well*	CSCWD = Central Shoshone County Water District SCWC = Silver Creek Water Company PWD = Pinehurst Water District
	U = Upper Zone	Y = Yes
	L = Lower Zone	N = No
•	C = Confining Zone	P = Possibly
	A = Alluvium	E = East
	B = Bedrock	W = West

<sup>\*</sup>Leaking and potentially leaking wells are defined in the text

BH = Bunker Hill

TABLE A - 3. INDUSTRIAL WELL CLOSURE DATA

Number on Figure 2	Located in	Well Name	Hole Diameter (inches)	Hole Depth (feet)	Casing Diameter (inches)	Casing Depth (feet)	Screen Interval (feet)	Probable Completion Zone	Closure Required	Alternate Water Source
1	N	BUNKERHIL	NA	N A	NA	NA	N A	В	Р .	NA
2	Y	BH NO.1	72	71.7	72	72	NA	U or L	Y	NA
3	<sup>1</sup> N	BH NO. 2	72	75.5	72	76	NA	L	Y	NA
4	: N	BH NO. 3	72	48.9	72	49	NA	L	Y	NA
5	N	BH NO. 4	72	58.1	72	58	NA	L	Y	NA
6	. <b>N</b>	BH NO. 5	72	58	72	58	NA	L	Y	NA
7	' N	BUNKER 1	NA	NA	NA	NA	NA	U or L	Y	NA
8	. Y	CHAFFBROS	10	152	8	67	57 – 67	บ	Y	NA
9	N	SUL. SE	NA	NA	NA	NA	NA	NA	Y	NA
10	N	SUL. 6E	72	70.6	72	71	NA	NA	Y	NA
11	N	SUL. 7	NA	NA	NA	NA	NA	NA	Y	NA
12	N	SUL. 8	·NA	NA	NA	N A	NA	NA	Y	NA
13	N	SUL.9	NA	NA	NA	NA	NA	NA	Y	NA
14	N	SUL. 10	NA	NA	NA	NA	NA	NA	Y	NA
15	N	UNKNOWN	NA	NA	NA	NA	NA	NA	Y	NA
16	N	UNKNOWN	NA	NA	NA	NA	NA	NA	Y	NA
17	N	BH NO. 12	NA	83.5	16	NA	NA	L	Y	NA
18	N	BH NO. 13	NA	83.5	NA	NA	NA	L	Y	NA
19	N	BH NO. 14	NA	83.5	NA	NA	NA	L	Y	NA
20	Y	PP-01	NA	63.5	60	NA	NA	L	Y	NA
21	N	SUL. 1	72	195	72	77	67 – 77	В	Y	NA
22	N	SUL. 2	72	89	72	89	77 – 87	L	Y	NA
23	N	SUL. 3	72	85	72	85	75 – 85	L	Y	NA
24	N	SUL. 4	NA	85	15	NA	NA	L	Y	NA -
25	N	SUL. 5	NA	NA	NA	NA	NA	U or L	Y	NA
26	N	SUL 6.	NA	NA	16	NA	NA ·	NA	Y	NA
27	N	BH NO. 6	NA	. 80	12	NA	NA	L	Y	NA
28	N	BH NO.7	NA	80	12	NA	NA	L	Y	NA
29	N	BH NO. 8	NA	79.5	16	NA	NA ·	L	Y	NA
30	N	BH NO. 9	. NA	80	16	80	NA	Ĺ	Y	NΑ
31	N	BH NO. 10	NA	NA	NA	NA	NA	L	Y	NA
32	N	BH NO. 11	NA	83	NA	NA	NA	L	Y	NA
33	N	OLD NO.5	NA	85.2	14	85	NA	L	Y	NA
34	N	BUNKER 2	NA	NA	NA	NA	NA	NA	Y	NΑ
35	N	GENWOVE	NA	NA	8	80	NA	L	Y	N
36	Y	ΝA	NA	NA	NA	NA	NA	NA	Y	CSCWD
37	N	UNKNOWN	NA	NA	NA	NA	NA	NA	Y	NA

### TABLE A - 3. INDUSTRIAL WELL CLOSURE DATA (continued)

Number on	Leakage	Location Relative To Central Valley	Maximum Material Volumes	
Figure 2	Status	Constriction	(cu ft)	Comments
1	- NL		7.9	Water Well At Sierra Nevada Mine Site
2	PL	E	2026:2	•
3	PL	E	2133.6	
4	PL	E	1381.9	
5	PL	E	1641.9	
6	PL	E	1639.1	
7	PL	E	7,9	
8	NL		23,4	·
9	PL	E	7.9	Location covered by middle cell
10	. PL	w	1995.2	Location covered by west cell
11	PL	w	7.9	Possibly covered by west cell
12	PL	w	7.9	Location covered by west cell
13	PL	E	7.9	Location covered by middle cell
14	PL	E	7.9	Location covered by middle cell
15	PL	E	7.9	Listed as "dry"
16	PL	.   w	7.9	Listed as "caved"
17 .	PL	w	116.6	
18	PL	w	116.6	
19	P L	w	116.6	
20	PL	w	1178.1	
21	PL	w	2176.0	
22	P L	w	2515.1	Destroyed, Underneath Freeway
23	PL	w	2402.1	
24	PL	w	104.3	·
2.5	PL	w	7.9	Destroyed
26	PL	w	55.9	Destroyed
27	PL	w	62.8	•
28	PL	w	62.8	
29	PL	w	111.0	•
30	PL	w	111.6	
31	PL	w	7.9	
32	P.L	w	16.3	
33	PL	w	91.0	·
34	PL	w	7.9	
35	PL	w	27.9	
36	PL	w	7.9	Happy Landing Tavern
37	PL	w	7.9	Location covered by CIA

### TABLE A – 3. INDUSTRIAL WELL CLOSURE DATA (continued)

Number on Figure 2	Located in	Well Name	Hole Diameter (inches)	Hole Depth (feet)	Casing Diameter (inches)	Casing Depth (feet)	Screen Interval (feet)	Probable Completion Zone	Closure Required	Alternate Water Source
38	N	UNKNOWN	NA	NA	NA	NA	NA	NA	Y	NA
39	N	UNKNOWN	NA	NA	NA.	NA	NA	NA	Y	NA
40	· N	UNKNOWN	NA	NA	NA	NA	NA	NA	Y	NA
41	N	UNKNOWN	NA	NA	NA	NA	NA	NA	Y	NA
42	N	ZINKGRAF 1	NA	123	10	123	8 - 35	NA	Y	NA
43	1 Y	Α	NA	NA	NA	18	NA	υ	N	NA
44	Υ	В	NA	NA	NA	NA	NA	NA	N	NA

TOTALS:

44

= 41 CSCWD = 1

2 N = 1

P = 1 NA = 42

### TABLE A -3. INDUSTRIAL WELL CLOSURE DATA (continued)

Number on Figure 2	Leakage Status	Location Relative To Central Valley Constriction	Maximum Material Volumes (cuft)	Comments
38	l PL	w	7.9	Location covered by CIA.
39	PL	w		<b></b>
40	PL	w	7.9 7.9	Listed as "dry"
41	PL	w	7.9	Listed as "dry"
42	NL		67.1	Bunker Hill Co. Test Well
43	NL			Recharge Well; domestic well #1 (D&M #1)
44	PL	E		Recharge Well

PL = 40 W = 29	44	NL = 4 PL = 40	E = 11 W = 29
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B = Bedrock

20314 752

Notes:

NA = Data not available
NL = Non-leaking well\*
CSCWD = Central Shoshone County Water District
PL = Potentially leaking well\*
V = Yes
U = Upper Zone
N = No
L = Lower Zone
P = Possibly
C = Confining Zone
E = East
A = Alluvium
W = West

\*Leaking and potentially leaking wells are defined in the text

TABLE A-4. MONITORING AND AQUIFER TEST WELL CLOSURE DATA

Number on Figures 3a-3c	Located in Area I?	Well Number	Borehole Diameter (inches)	Borehole Depth (feet)	Casing Diameter (inches)	Casing Depth (feet)	Screen Interval (feet)	Probable Completion Zone
NA	Y	UNK #04A	NA	NA	1.00	15.9	NA	T or U
NA	Y	UNK #04B	NA	NA	1.00	24.1	NA	T or U
NA	Y	UNK #05A	NA	NA	1.00	16.51	NA	T or U
NA	Y	UNK #05B	NA	NA	1.00	24	NA	T or U
NA	· Y	UNK #05C	NA	NA	1.00	13.8	NA	T or U
NA	Y	UNK #06	ΝA	NA	6.00	NA	NA	T or U
NA	Y	UNK #07	NA	NA	1.00	16.34	NA	T or U
NA	Y	UNK #08	NA	NA	1.00	NA	NA	T or U
NA	Y	UNK #09	NA	NA	1.00	21.41	NA	T or U
NA	Y	UNK #10	NA	NA	1.00	18.93	NA	T or U
NA	Y	UNK #11	NA	NA	1.00	21.36	NA	T or U
NA	Y	UNK #12	ŅΑ	NA	1.00	25.18	NA	T or U
NA	Y	UNK #13	NA	NA	1.00	18.56	NA	T or U
NA	Y	UNK #14	NA	. NA	1.00	19.58	NA	T or U
NA	Y	UNK #15	NA	NA	1.00	20.9	NA	T or U
NA	Y	UNK #16	NA	NA	1.00	17.05	NA	T or U
NA ,	, · Y	UNK #17	NA	NA	1.00	26	NA	T or U
NA	Y	UNK #18	NA	NA	1.00	17.76	NA	T or U
NA	Y	UNK #19	NA	NA	1.00	23.39	NA	T or U
NA ·	Y	UNK #20A	NA	NA	1.00	21.55	NA	T or U
·NA	Y	UNK #20B	NA	NA	1.00	21.14	NA	T or U
, NA	Y	UNK #21A	NA	NA	1.00	21.51	NA	T or U
/ NA	Y	UNK #21B	NA	NA	1.00	24.95	NA	T or U
NA	Y	UNK #21C	NA	NA	1.00	23.84	NA	T or U
NA	Y	UNK #22	NA	NA	1.25	10	NA	T or U
NA	Ÿ	UNK #23	NA	NA	1.00	4.78	NA	T or U
NA	Ÿ	UNK #24	NA	NA	1.25	12.86	NA	T or U
NA	Y	UNK #25	NA	NA	1.00	12.15	NA	T or U

TABLE A-4. MONITORING AND AQUIFER TEST WELL CLOSURE DATA (continued)

Number on Figure 3	'Closure Required	Leakage Status	Minimum Material Volumes (cu ft)	Maximum Material Volumes (cu ft)	Comments
				***************************************	
N/A	$\mathbf{Y}$	NL	0.1	0.1	NE corner of Page Pond, Possibly EP - 5
N/A	Y	NL	0.1	0.1	NE corner of Page Pond, Possibly EP - 5
N/A	, Y	NL	0.1	0.1	East Middle Dike of Page Pond, Possibly EP - 6
, N/A	Y	NL	0.1	0.1	East Middle Dike of Page Pond, Possibly EP - 6
N/A	Y	NL	0.1	0.1	East Middle Dike of Page Pond, Possibly EP - 6
N/A	Y	NL	7.9	7.9	SE Corner of Page Pond
N/A	Y	NL	0.1	0.1	SE 200 ft from SE Corner of Sewage, Page Pond
N/A	Y	NL	0.2	0.2	SE 200 ft from SE Corner of Page Sewage, Plugged
N/A	Y	NL	0.1	0.1	SE 200 ft from SE Corner of Sewage, Possibly W - 3
N/A	Y	NL	0.1	0.1	SW of Page Tailings Pond, Possibly P-1 or P-2
N/A	Y	NL	0.1	0.1	SW Corner of Page Tailings Pond, Possibly P-1 or P-2
N/A	Y	NL	0.1	0.1	SW Corner of Page Tailings Pond, Possibly P-1 or P-2
N/A	Y	NL	0.1	0.1	SW Corner of Page Tailings pond
N/A	Y	NL	0.1	0.1	Western Section of Page Tailings Pond, Possibly WP-5
N/A	Υ .	NL	0.1	0.1	Western Section of Page Tailings Pond, Possibly WP-5
N/A	Y	NL	0.1	0.1	Western Section of Page Tailings Pond, Possibly WP-5
, N/A	Y	NL	0.1	0.1	Western Section of Page Tailings Pond, Possibly WP-4
N/A	Y	NL	0.1	0.1	Western Page Tailings Pond, Possibly WP-4
N/A	Y	NL NL	0.1	0.1	West Page Tailings, Broken at Surface, Possibly WP-4
N/A	Y	NL	0.1	0.1	NW Corner of West Page Tailings, Broken at Surface
N/A	Y	NL	0.1	0.1	NW Corner of East Page Tailings, Broken at Surface
N/A	Y	NL	0.1	0.1	150 ft W of NW Corner Sewage Ponds, Possibly WP - 3
N/A	Y	NL	0.1	0.1	150 ft W of NW Corner Sewage Ponds, Possibly WP - 3
N/A	Y	NL	0.1	0.1	150 ft W of NW Corner Sewage Ponds, Possibly WP - 3
N/A	· Y	NL	0.1	0.1	Possibly C-11
N/A	Y	NL	0.0	0.0	50' NW of NW Corner, Page Pond, Possibly C-1, C-2
N/A	Y	NL	0.1	0.1	125 ft NW of NW Corner of Page Pond, Possibly C-3
N/A	Y	NL	0.1	0.1	7 ft S of Highway Fence Right of Way, Possibly C-10

TABLE A-4. MONITORING AND AQUIFER TEST WELL CLOSURE DATA (continued)

Number on Figures 3a-3c	Located in Area I?	Well Number	Borehole Diameter (inches)	Borehole Depth (feet)	Casing Diameter (inches)	Casing Depth (feet)	Screen Interval (feet)	Probable Completion Zone
NA	Y	UNK #26	NA	NA	4.00	. 5	NA	T or U
NA	Y	UNK #27	NA	NA	1.00	9.85	NA	T or U
NA	Y	UNK #28	NA -	NA	1.00	NA	NA	T or U
NA	Y	UNK #29	NA	NA	1.00	4.18	NA	T or U
NA	Y	UNK #30	NA	NA	1.00	4.75	NA	T or U
NA	Y	UNK #31	NA	NA	1.25	12.28	NA	T or U
NA	Y	UNK #32	NA	NA	2.00	8.85	NA	T or U
NA	Y	UNK #33	NA	NA	1.25	NA	NA	T or U
1	NA	01	8	- 30	1.50	30.0	10-30	U
2	N	02	8	40	1.50	40	10-40	U
3		03	8	20	1.50	20	10-20	U
4	N	04	8	. 29	1.50	29	9-29	U
5	N	05	. 8	· 40	1.50	40	10-40	U
6	N	06	8	10	1.50	10	1-10	U
7	N	07	8	29	1.50	27	17-27	С
8	N	08	8	29	1.50	28	8-28	U
9	. N	09	8	29	1.50	28	8-28	U
10	N	10	8	19.5	1.50	19.5	5-6	U,C
11	N	11	. 8	19	1.50	19	9-19	U,C
12	N	12	8	29	1.50	29	9-29	U,C
· 13	N	13	. 8	29	1.50	28	8-28	U,C
, 14	N	14	8	19	1.50	19	9-19	U
15	N	15	8	29	1.50	30	10-30	U,C
16	N	16	8	20	1.50	· 20	10-20	U,C
17	· <b>N</b>	17	8	19	1.50	19	9-19	U,C
18	N	18	8	19	1.50	. 19	9-19	U,C
19	N	19	8	30	1.50	30	10-30	U,C
20	N	20	8	29	1.50	29	9-29	U,C

TABLE A-4. MONITORING AND AQUIFER TEST WELL CLOSURE DATA (continued)

Number on Figure 3	Closure Required	Leakage Status	Minimum Material Volumes (cu ft)	Maximum Material Volumes (cu ft)	Comments
	<u> </u>				
N/A	, Y	NL	0.4	0.4	Test Pit
N/A	Y	NL NL	0.1	0.1	20 ft SE of UNK #26
N/A	$_{i}$ Y	NL	0.2	0.2	Plugged
N/A	, Y	NL	0.0	0.0	Possibly H - 02
N/A	Y	NL	0.0	0.0	Tilted
N/A	Y	NL	0.1	0.1	One of the J Series Wells
N/A	Y	NL	0.2	0.2	Cap Rusted
N/A	Y	NL	0.3	0.3	Below Base of SW Corner of Page Pond, Tilted
1	Y	NL	0.4	0.4	Location data unavailable
2	Y	NL	0.5	0.5	
3	Y	NL	0.2	0.2	•
4	Y	NL	0.4	0.4	
5	Y	NL	0.5	0.5	•
6	Y	NL	0.1	0.1	
7	Y	NL	0.3	0.3	
8	Y	NL	0.3	0.3	
, · 9	Y	NL	0.3	0.3	
10	Y	NL.	0.2	0,2	
- 11	Y	NL	0.2	0.2	•
12	Y	NL	0.4	0.4	
13	Y	NL	0.3	0.3	
14	Y	NL	0.2	0.2	
15	Y	NL	0.4	0.4	•
16	Y	NL NL	0.2	0.2	
17	Y	NL	0.2	0.2	
18	Y	NL NL	0.2	0.2	
19	Y	NL NL	0:4	0.4	
20	Y	NL	0.4	0,4	

TABLE A-4. MONITORING AND AQUIFER TEST WELL CLOSURE DATA (continued)

Number on Figures 3a-3c	Located in Area I?	Well Number	Borehole Diameter (inches)	Borehole Depth (feet)	Casing Diameter (inches)	Casing Depth (feet)	Screen Interval (feet)	Probable Completion Zone
21	N	, 21	8	29	1.50	29 -	9-29	U,C
22	Y	22	8		1.50	29	9-29	U,C
23	Ÿ.	23	8		1.50	39	9-39	U,C
24	Y.	24	8		1.50	39	9-39	U,C
25	N	25	8		1.50	19	9-19	U
26	N	26	8		1.50	28.5	9.5-28.5	Ū
27	N	B-01	NA	55.5	0.50		22-29; 48-54	T
. 28	N	B-01	NA	NA	0.75	NA	ΝA	T
29	N	B-02	NA	66	0.50	NA	25-33;59-66	T
30	N	B - 03	NA	73.5	0.50	NA	31-39;64-70	T
32	N	B-04	NA	59.5	0.50	NA	29-32;51-57	T
33	N	B - 04	NA	NA	0.75	NA	NA	Т
34	N	B-05	NA	56.5	0.50	NA	20-26; 48-54	T
35	N	B - 05	NA	NA	0.75	NA	NA	T
36	N	B - 06	NA	69.5	0.50	NA	24-30; 57-65	T
37	N	B - 07	NA	65	0.50	NA	27-34; 55-62	T
38.	· N	B - 07	NA	NA	0.75	NA	NA	T.
39	N	B - 08	NA	69.5	0.50	NA	29-32; 60-67	T
40	N	B - 09	NA	70	0.50	NA	43-51; 64-70	T
. 41	N	B-11	NA	NA	0.75	NA	NA	T
42	N	B-21	NA	NA	0.75	NA	NA	T
, 43	N	BH-A	NA	15	NA	NA	NA	T
44	N	BH-B	NA	14.5	1.50	16.9	NA	T
45	N	BH-C	NA	13	1.50	8.5	NA	T
46	N	BH-D	. NA	15.5	1.50	17.54	NA	T
47	N	BH-E	NA	14	ΝA	NA	NA	T
48	N	DH-01	g	83	2.00	83	78-83	C,L
49	N	DH -02	Ģ	9 47.5	2.00	47.5	42.5-47.5	С

TABLE A-4. MONITORING AND AQUIFER TEST WELL CLOSURE DATA (continued)

Number on Figure 3	Closure Required	Leakage Status	Minimum Material Volumes (cu ft)	Maximum Material Volumes (cu ft)	Comments
21	, Y	NL	0.4	0.4	`
. 22	Y	NL	0.4	0.4	
23	$_{_{I}}$ $\mathbf{Y}$	NL NL	0.5	0.5	
24	Y	NL	0.5	0.5	
25	Y	NL	0.2	0.2	
26	<b>Y</b> .	NL	0,3	0.3	
27	Y	NL	0.1	0.1	
28	Y	NL	0.1	0.1	
29	Y	NL	0.1	0.1	
30	Y	NL	0.1	0.1	• .
32	Y	NL	0.1	0.1	
33	Y	NL	0.1	0.1	
34	Y	NL NL	0.1	0.1	
35	Y	NL NL	0.1	0.1	
36	Y	NL	0.1	0.1	
37	Y	NL NL	0.1	0.1	
38	Y	NL	0.1	0.1	
39	Y	NL	0.1	0.1	
40	Y	NL	0.1	0.1	
41	Y	NL	0.1	0.1	
42	Y	NL NL	0.1	0.1	
43	Y	NL	0.3	0.3	·
44	Y	NL	0.2	0.2	
45	Y	NL	0.1	0.1	
46	Y	NL	0.2	0.2	
47	Y	NL	0,3	0.3	
48	Y	PL	1.8	1.8	
49	Y	NL	1.0	1.0	

TABLE A-4. MONITORING AND AQUIFER TEST WELL CLOSURE DATA (continued)

Number on Figures 3a-3c	Located in Area I?	Well Number	Borehole Diameter (inches)	Borehole Depth (feet)	Casing Diameter (inches)	Casing Depth (feet)	Screen Interval (feet)	Probable Completion Zone
50	N	DH -02A	9	54.5	2.00	54.5	49.5-54.5	С
51	N	DH -03	9	37.5	2.00	38.3	32.5-37.5	U,C
52	N	DH -04	9	44.5	2.00	38.7	39.5-44.5	U,C
53	N	DH -05	9	39.5	2.00	34	34.5-39.5	U,C
54	N	DH -06	9	39	2.00	38.5	34 - 39	U,C
55	N	DH-07	9	37.5	2.00	37.5	32.5-37.5	U,C
56	N	DH -08	9	39.5	2.00	36.14	34.5-39.5	U,C
57	N	DH - 09	9	37.5	2.00	39.47	32.5-37.5	U,C
58	N	DH - 11	9	37.5	2.00	39.35	32.5-37.5	С
59	N	DH - 12	. 9	39.5	2.00	29	34.5-39.5	С
60	N	DH-13	9	42	2.00	27.15	38-42	С
61	N	DH - 14	, 9	37.5	2.00	37.5	32.5-37.5	С
62	N	DH - 15	9	44.5	2.00	44.5	39.5-44.5	U,C
63	N	DH - 16	9	58.5	2.00	58.5	53.5-58.5	L
64 -	N	DH - 17	9	64.5	2.00	64.5	59.5-64.5	L
65	N	DH - 18	9	61	2.00	61	56-61	L
66.	N	DH - 19	9	34	2.00	34	29-34	C,L
67	N	DH-20	9	34	2.00	34	29-34	U
68	N	DH -21	9	49	2.00	53.7	44-49	U,C
69	N	DH -22	9	34.5	2.00	34.5	29.5-34.5	Ų,C
. 70	N	DH -23	9	34.5	2.00	26.7	29.5-34.5	C,L
, 71	N	DH -24	9	34	2.00	NA	29 - 34	U
72	N	DH -25	9	39.5	2.00	27	34.5-39.5	U
73	N	DH -26	9	80	2.00	78.04	75-80	U
74	N	DH-27	9	90	2.00	90	85-90	U,C
75	N	DH -28	9	94	2.00	94	89-94	Ĺ
76	N	DH -29	9	97.5	2.00	97.5	92.5-97.5	L
77	N	DH - 30	9	97.5	2.00	97.5	92.5-97.5	L

TABLE A-4. MONITORING AND AQUIFER TEST WELL CLOSURE DATA (continued)

Number on Figure 3	'Closure Required	Leakage Status	Minimum Material Volumes (cu ft)	Maximum Material Volumes (cu ft)	Comments	
			(0.0.10)	(0.0.10)		
50	Y	NL NL	1.2	1.2		1
51	' Y	NL	0.8	0.8	·	
52	, Y	NL	0.8	0.8		
53	, Y	NL	0.7	0.7		
54	Y	NL	0.8	0.8		
55	Y	NL	0.8	0.8		
56	Y	NL .	0.8	0.8		
57	Y	NL	0.9	0.9		
58	Y	NL	0.9	0.9		
- 59	Y	NL	0.6	0.6		
60	Y	NL	0.6	0.6		
61	Y.	NL	0.8	0.8		
62	Y	NL	1.0	1.0		
63	Y	PL	1,3	1.3		
64	Y	PL	1.4	1.4		
65	Y	PL	1.3	1.3 0.7		
. 66	Y	PL	0.7	0.7		
67	Y	NL	0.7	0.7		
68	Y	NL	1.2	1.2		
69	Y	NL	0.8	0.8		
70	Y	PL	0.6	0.6		
71	Y	NL	0.7	0.7		
72	Y	NL	0.6	0.6		
73	Υ	NL	1.7	1.7		
74	Y	NL L	2.0	2.0		
75	Y	PL	2.0	2.0	•	
76	Y	PL	2.1	2.1		
77	Y	PL	2.1	2.1		

TABLE A-4. MONITORING AND AQUIFER TEST WELL CLOSURE DATA (continued)

Number on Figures 3a-3c	Located in Area I?	Well Number	Borehole Diameter (inches)	Borehole Depth (fect)	Casing Diameter (inches)	Casing Depth (feet)	Screen Interval (feet)	Probable Completion Zone
78	N	DH-31	9	. 80	2.00	80	75-80	L
79	N	DH - 32	6	15	2.00	11.65	14-15	U
80	N	<sub>i</sub> DH – 33	6	12	2.00	12.9	10.1-11.1	U
81	N	DH - 34	6	39.1	2.00	31.55	25.7-28.7	С
82	N	E-01	8	40	1.50	NA	NA	T,U
83	N	E-02	8	65	1.50	NA	NA	F,U
84	N	E-03	8	60	1.50	NA	NA	T,U
85	N	E-04	8	20	1.50	NA	NA	U
86	N ·	E-05	8	40	1.50	NA	20-40	F,U
87	N	G01	NA	NA	0.75	NA	NA	Τ
88	N	G02	NA	NA	0.75	NA	NA	T
89	N	G03	NA	NA	0.75	NA	NA	T
90	N	G04	NA	NA	0.75	NA	NA	T
91	N	G05	NA	NA	0.75	NA	NA	T
92	N	G06	NA	NA	0.75	NA	NA	Τ
93	N	G07	NA	NA	0.75	NA	NA	T
94.	· N	G08	NA	NA	0.75	NA	NA	T
95	N	G12	NA	NA	0.75	NA	NA	T
96	N	G13	. NA	ΝA	0.75	NA	NA	T
. 97	Ν -	G17	NA	NA	0.75	NA ·	NA	T
98	N	G20	. NA	NA	0.75	NA	NA	T
, 99	N	G26	NA	NA	0.75	NA	NA	T
100	N	G27	NA	NA	0.75	NA	NA	T
101	N	. G28	, NA	NA	0.75	NA	NA	T
102	N	G29	NA	NA	0.75	NA	NA	T
103	N	G30	NA	NA	0.75	NA	NA	T
104	N	G31	NA	NA	0.75	NA	NA	T
105	N	G32	NA	NA	0.75	NA	NA	T

TABLE A-4. MONITORING AND AQUIFER TEST WELL CLOSURE DATA (continued)

Number on	Closure	Leakage	Minimum Material Volumes	Maximum Material Volumes		
Figure 3	Required	Status	(cu ft)	(cu ft)	Comments	_
78	Y	PL	1.7	1.7		4
78 79	; Y	NL NL	0.3	0.3		
80	Y Y	NL NL	0.3	0.3		
81	Y	NL	0.5	0.7		
82	Y	NL	0.7	0.5		
83	Y	NL NL	0.8	0.8		
84	Ÿ	NL NL	0.7	0.7		
85	Y	NL	0.2	0.2		
86	Ÿ	NL	0.5	0.5		
87		NL	0.1	0.1		
88	Y	NL	0.1	0.1		
89	Y	NL .	0.1	0.1		
90	Y	NL	0.1	0.1		
91	Y	NL	0.1	0,1	1	
92	Y	NL	0.1	0.1		
93	Y	NL	0.1	0.1		
94	Y	NL	0.1	0.1		
95	Y	NL	0.1	0.1		
96	Y	NL	0.1	0.1		
97	Y	NL	0:1	0.1		
98	Y	NL	0.1	0.1		
99	Y	NL	0.1	0.1	•	
100	Y	NL	0.1	0.1		
101	Y	NL	0.1	0.1		
102	Y	NL	0.1	0.1		
103	Y	NL	0.1	0.1		
104	Y	NL	0.1	0.1		
105	Y	NL	0.1	0.1		

TABLE A-4. MONITORING AND AQUIFER TEST WELL CLOSURE DATA (continued)

Number on Figures 3a-3c	Located in Area I?	Well Number	Borehole Diameter (inches)		Borehole Depth (feet)	Casing Diameter (inches)	Casing Depth (feet)	Screen Interval (feet)	Probable Completion Zone
106	N	G33	NA		NA	0.75	NA	NA	Т
107	N	G34	NA		NA	0.75	NA	NA	T
108	N	G35	NA		NA	0.75	NA	NA	T
109	N	G36	NA		NA	0.75	NA	NA	T
110	N	LUM YRD		8	NA	1.50	NA	NA	T
111	N	S-01	NA		NA	0.75	NA	NA	T
112	N	T-01	NA		NA	0.75	NA	NÄ	T
113	N	T-02	NA		NA	0.75	NA	NA	T
114	N	T-03	NA		NA ·	0.75	NA	NA	Т
115	N	T-04	NA		NA	0.75	NA	NA	T
116	N	T-05	NA		NA	0.75	NA	NA	Т
117	N	T-06	NA		NA	0.75	NA	NA	T
118	N	TB7	·	8	NA	2.00	14.67	NA	U
120	Y	04 - 05 - 16		2	15.9	0.75	15.9	NA	U
121	Y	04 - 05 - 18		2	20	0.75	20	NA	U
122	Y	A-01		2	8.3	0.75	8.3	NA	U
123,	· Y	A - 02		2	7.4	0.75	7.4	NA	U
124	Y	A-03		2	7.7	0.75	7.3	NA	U
125	Y	A - 04		2	7.3	0.75	7.3	NA ·	U
. 126	NA	A - 05		2	5.4	0.75	5.4	NA	U
127	Y	A - 06		2	10	0.75	10	NA	U
128	Y	B-1		2	8.1	0.75	5.95	NÀ	U
/ 129	Y	B-2		Ż	5.6	0.75	7.83	NA	U
130	Y	B-3		2	8	0.75	NA	NA	U
130	Y	B-3 DUAL		2	NA	NA	12	NA	U
131	Y	B-4		2	9.2	0.75	NA	NA	Ŭ
132	Y	C-01		2	7.9	0.75	7.9	NA	U
133	Y	C-02		2	6.8	0.75	6.8	NA	U

TABLE A-4. MONITORING AND AQUIFER TEST WELL CLOSURE DATA (continued)

Number on	'Closure	Leakage	Minimum Material Volumes	Maximum Material Volumes	
Figure 3	Required	Status	(cu ft)	(cu ft)	Comments
100	: 7/	1 - 1 - 1	0.1	0.1	•
106 107	; <b>Y</b> Y	NL NL		0.1	•
		NL.	0.1		
.108 109	$\frac{\mathbf{Y}}{\mathbf{Y}}$	NL NL	0.1 0.1	0.1 0.1	
110	Y	NL	0.1	0.1	
110	Y	NL	0.1	0.5	
112	Y	NL NL	0.1	0.1	
113	Y	NL	0.1	0.1	
114	Y	NL NL	0.1	0.1	
115	Y	NL	0.1	0.1	•
116	Y	NL	0.1	0.1	
117	Ŷ	NL	0.1	0.1	
118	Y	NL	0.3	0.3	
120	Ÿ	NL	0.0	0.0	
121	Y	NL	0.1	0.1	
122	Y	NL	0.0	0.0	
123	Y	NL	0.0	0.0	
124	Y	NL	0.0	0.0	
125	Y	NL	0.0	0.0	
126	Y	NL	0.0	0.0	Location data unavailable.
127	Y	NL	0.0	0.0	
128	Y	NL	0.0	0.0	•
129	Y	NL	0.0	0.0	
130	Y	NL	0.0	0.0	·
130	Y	NL	0.0	0.0	·
131	Y	NL	0.0	0.0	
132	Y	NL	0.0	0.0	
133	Y	NL	0.0	0.0	

TABLE A-4. MONITORING AND AQUIFER TEST WELL CLOSURE DATA (continued)

Number on Figures 3a-3c	Located in Area I?	: ' Well Number	Borehole Diameter (inches)	Borehole Depth (feet)	Casing Diameter (inches)	Casing Depth (feet)	Screen Interval (feet)	Probable Completion Zone
134	Y	C-03	2	10.6	0.75	10.6	NA	Ū
135	N	C-04	2	7.9	0.75	7.9	NA	Ū
136	Y	C-05	2	6.8	0.75	6.8	NA	U
137	N	C-06	2	8.2	0.75	8.2	NA	U
138	NA	C-07	2	7.9	0.75	7.9	NA	U
139	NA	C-08	2	12.8	0.75	12.8	NA	U
140	N	C-09	2	9.8	0.75	9.8	NA	U
141	N	C-10	2	12.9	0.75	12.9	NA	U
142	Y	C-11	. 2	10.3	0.75	10.3	NA	. <b>U</b>
143	Y	D - 01	2	7.7	0.75	7.7	NA	U
144	Y	D - 02	2	7.2	0.75	7.2	NA	U
145	Y	E-01	2	5.9	0.75	5.9	NA	U
146	Y	E-02	2	7	0.75	7	NA	U
147	N	E-03	2	6.2	0.75	6.2	NA	U
148	N	E-04	2	8.1	0.75	8.1	NA	U
149	Y	EP - 01 - 17	2	16.7	0.75	16.7	NA	T
150	· Y	EP-01-26	2	26	0.75	26	NA	Τ
151	NA	EP - 02 - 13	2	14.7	0.75	14.7	NA	T
152	NA	EP-02-17	2	18.5	0.75	18.5	NA	T
. 153	NA	EP - 02 - 20	2	21.5	0.75	21.5	NA	T
154	Y	EP-03-16.5	2	16.5	0.75	16.5	NA	T
, 155	Y	EP-03-24	2	23.9	0.75	23.9	NA	T
156	Y	EP-04-16	2	16	0.75	16	NA	T
157	Y	EP-04-17	2	17.6	0.75	17.6	NA	T
158	Y	EP - 04 - 21	2	21.1	0.75	21.1	NA	T
159	Y	EP-04-22	2	21.1	0.75	21.1	NA	T
160	Y	EP-05-12	2	10.3	0.75	· 10.3	NA	T
161	Y	EP-05-15	2	13.7	0.75	13.7	NA	T

TABLE A-4. MONITORING AND AQUIFER TEST WELL CLOSURE DATA (continued)

Number on Figure 3	Closure Required	Leakage Status	Minimum Material Volumes (cu ft)	Maximum Material Volumes (cu ft)	Comments
		1	4 M. C Mala destroyaux consequent	encontrated assertings I	
134	, <b>Y</b>	NL	0.0	0.0	·
135	Y	NL	0.0	0.0	
136	$T = \mathbf{Y}$	NL	0.0	0.0	
137	' . Y	NL	0.0	0.0	
138	Y	NL	0.0	0.0	Location data unavailable.
139	Y	NL	0.0	0.0	Location data unavailable.
140	Y	NL	0.0	0.0	
141	Y	NL	0.0	0.0	
142	Y	NL	0.0	0.0	
143	Y	NL	0.0	0.0	
144	Y	NL	0.0	0.0	
145	Y	NL	0.0	0.0	
146	Y	NL	0.0	0.0	
147	Y	NL	0.0	0.0	
148	Y	NL	0.0	0.0	
149	Y	NL	0.1	0.1	
150	Y	NL NL	0.1	0.1	·
151	Y	NL	0.0	0.0	Location data unavailable.
152	Y	NL	0.1	0.1	Location data unavailable.
153	Y	NL	0.1	0.1	Location data unavailable.
154	Y	NL	0.1	0.1	
155	Y	NL	0.1	0.1	
156	Y	NL	0.0	0.0	
157	Y	NL	0.1	0.1	
158	Y	NL	0.1	0.1	
159	Y	NL	0.1	0.1	•
160	Y	NL	0.0	0.0	
161	Y	NL	0.0	0.0	

TABLE A-4. MONITORING AND AQUIFER TEST WELL CLOSURE DATA (continued)

Number on Figures 3a-3c	Located in Area I?	Well Number	Borehole Diameter (inches)	Borehole Depth (feet)	Casing Diameter (inches)	Casing Depth (feet)	Screen Interval (feet)	Probable Completion Zone
162	Y	EP-05-16	2	16.9	0.75	16.9	NA	Т
163	Y	EP-05-10	2	20.7	0.75	20.7	NA	T
164	Y	EP-05-25	2	20.7	0.75	22.3	NA NA	T
165	Y	EP - 05 - 27	2	28.6	0.75	28.6	NA	Ť
166	· Y	EP-06-17	. 2	17.5	0.75	17.5	NA NA	Ť
167	Y	EP-06-19	2	18.7	0.75	18.7	NA	Ť
168	Ÿ	EP-06-20.5	. 2	21.7	0.75	21.7	NA	Ť
169	Ÿ	EP-06-23	2	22.8	0.75	22.8	NA	Ť
170	NA	EP-07-16	2	16.5	0.75	16.5	NA	Ť
171	NA	EP-07-23	2	22.9	0.75	22.9	NA	Ť
172	NA	EP-08	2	24.7	0.75	24.7	NA	Ť
173	NA	EP-09	2	19.1	0.75	19.1	NA	Ť
174	NA	EP-45	2	16.6	0.75	16.6	NA	T
175	Y	EP-56	2		0.75	16.5	NA	T
176	Y	EP-57	2	17.8	0.75	17.8	NA	T
177	NA	EP-58	2	16.8	0.75	16.8	NA	T
178,	· NA	EP-59	2	17.2	0.75	17.2	NA	T
179	Y	G-01	2	3.8	0.75	3.8	NA	T
180	Y	G-02	2	8.3	0.75	8.3	NA	T
, 181	Y	G-03	2	7.8	0.75	7.8	NA	U
182	Y	H-01	2	2.6	0.75	2.6	NA	Τ
, 183	Υ .	I-01	2	4.1	0.75	4.1	NÀ	T
184	Y	I-02	2	7.5	0.75	7.5	NA	U
185	Y	J-01	2	5	0.75	5	NA	U
186	Y	J-2	2	8.5	0.75	2.57	NA	· U
187	Y	J-03	2	6.5	0.75	6.5	NA	U
188	Y	J-04	2	8.8	0.75	8.8	NA	U
189	Y	J-05	2	6.2	0.75	6.2	NA	U

TABLE A-4. MONITORING AND AQUIFER TEST WELL CLOSURE DATA (continued)

Number on Figure 3	Closure Required	Leakage Status	Minimum Material Volumes (cu ft)	Maximum Material Volumes (cu ft)	Comments
162	' Y	NE NE	0.1	0.1	
163	Y	NL	0.1	0.1	
164	, Y	NL	0.1	0.1	
165	Ŷ	NL	0,1	0.1	
166	Y	NL	0.1	0.1	
167	Y	NL	0.1	0.1	
168	Y	NL	0.1	0.1	
169	Y	NL NL	0.1	0.1	
170	Y	NL NL	0.1	0.1	Location data unavailable.
171	Y	NL	0.1	0.1	Location data unavailable.
172	Y	NL	0.1	0.1	Location data unavailable.
173	Y	NL	0.1	0.1	Location data unavailable.
174	Y	NL	0.1	0.1	Location data unavailable.
175	Y	NL	0.1	0.1	
176	Y	NL	0.1	0.1	
177	Y	NL	0.1	0.1	Location data unavailable.
178	Y	NL	0.1	0.1	Location data unavailable.
179	Y	NL	0.0	0.0	
180	Y	NL	0.0	0.0	
181	Y	ŇĽ	0.0	0.0	•
182	Y	NL.	0.0	0,0	•
183	Y	NL	0.0	0.0	
184	Y	NL NL	0.0	0.0	
185	Y	NL W	0.0	0.0	
186	Y	NL NL	0.0	0.0	
187	Y	NL	0.0	0.0	
188	Y	NL NI	0.0	0.0	
189	Y	NL	0.0	0.0	

TABLE A-4. MONITORING AND AQUIFER TEST WELL CLOSURE DATA (continued)

Number on Figures 3a-3c	Located in Area I?	Well Number	Borehole Diameter (inches)	Borchole Depth (feet)	Casing Diameter (inches)	Casing Depth (feet)	Screen Interval (feet)	Probable Completion Zone
190	Y	· J-06	2	9.5	0.75	9.5	NA	U
191	Y	J-07	2	9.4	0.75	9.4	NA	U
192	NA	, J-08	. 2	10.1	0.75	10.1	NA	U
193	Y	. K−01	2	8	0.75	8	NA	U
194	Y	K-02	2	6.1	0.75	6.1	NA	U
195	NA	KL-01	2	6.2	0.75	6.2	NA	. U
196	Y	L-01	2	8.2	0.75	8.2	NA	U
197	Y	L-02	2	7.7	0.75	7.7	NA	U
198	Y	M - 01	2	11.9	0.75	11.9	NA	U
199	Y	N - 01	2	8.2	0.75	8.2	NA	U
200	NA	N - 02	2	7.3	0.75	7.3	NA	U
201	Y	0-1	2	6.4	1.00	14.77	NA	U
202	Y	P-01	2	7.5	0.75	7.5	NA	U
203	Y	P-02	2	6.8	0.75	6.8	NA	U
204	NA	WP - 01 - 15	2	17	0.75	17	NA	NA
205	NA	WP - 01 - 18	· 2	18.8	0.75	18.8	NA	NA
206,	· Y	WP - 02 - 12.6	2	12.7	0.75	12.7	NA	Τ
207	Y	WP - 02 - 16	2	16.5	0.75	16.5	NA	T
208	Y	WP - 02 - 21	2	20.5	0.75	20.5	NA	T
209	Y	WP-03	2	24.8	0.75	24.8	NA	T
210	Y	WP - 04 - 19	. 2	19	0.75	19	NA	U
, 211	Y	WP - 04 - 24	2	24	0.75	24	NA	U
212	Y	WP-05-12	2	11.2	0.75	11.2	NA	Τ .
213	Y	WP - 05 - 15	2	13.8	0.75	13.8	NA	T
214	Y	WP - 05 - 16	2	16.3	0.75	16.3	NA	T
215	Y	WP-05-20	2	19.5	0.75	19.5	NA	T
216	Y	WP-05-21	2	22.6	0.75	22.6	NA	T
217	Y	WP-05-25	2	26.5	0.75	26.5	NA	T

TABLE A-4. MONITORING AND AQUIFER TEST WELL CLOSURE DATA (continued)

Number on Figure 3	'Closure Required	Leakage Status	Minimum Material Volumes (cu ft)	Maximum Material Volumes (cu ft)	Comments
1 iguio 3	Required	Otatus	(cu ii)	(cu ii)	Comments
190	, Y	NL NL	0.0	0.0	1
191	; Y	NL	0.0	0.0	
192	, Y	NL	0.0	0.0	Location data unavailable.
193	,	NL	0.0	0.0	
194	· Y	NL	0.0	0.0	
195	Y	NL	0.0	0.0	Location data unavailable.
196	Y	NL	0.0	0.0	
197	Y	NL	0.0	0.0	
198	Y	NL	0.0	0.0	
199	Y	NL	0.0	0:0	
200	Y	NL	0.0	0.0	Location data unavailable.
201	Y	NL	0.1	0.1	
202	Y	NL	0.0	0.0	
203	Y	NL	0.0	0.0	
204	Y	NL	0.1	0.1	Location data unavailable.
205	Y	NL	0.1	0.1	Location data unavailable.
206	Y	NL	0.0	0.0	
207	Y	NL	0.1	0.1	
208	Y	NL	0.1	0.1	
209	Y	NL	0.1	0.1	
210	Y	NL	0.1	0.1	
211	Y	NL	0.1	0.1	·
212	Y	NL	0.0	0.0	
213	Y	NL	0.0	0.0	
214	Y	NL	0.0	0.0	•
215	Y	NL	0.1	0.1	
216	Y	NL	0.1	0.1	
217	Y	NL	0.1	0.1	

TABLE A-4. MONITORING AND AQUIFER TEST WELL CLOSURE DATA (continued)

Number on Figures 3a-3c	Located in Area I?	: 'Well Number	Borehole Diameter (inches)		Borchole Depth (feet)	Casing Diameter (inches)	Casing Depth (feet)	Screen Interval (feet)	Probable Completion Zone
218	NA	WP - 06 - 18		2	11.2	0.75	11.2	NA	NA
219	NA	WP - 06 - 20		2	19.6	0.75	19.6	NA	NA
220	NA ·	WP - 06 - 21.5		2	23.1	0.75	23.1	NA	NA
221	NA	WP - 06 - 25		2	24.9	0.75	24.9	NA	NA
222	NA	WP - 07 - 21		2	21.3	0.75	21.3	NA	NA
223	NA	WP - 07 - 22		2	23.4	0.75	23.4	NA	NA
224	NA	WP-07-25		2	25.2	0.75	25.2	NA	NA
225	NA	WP-08		2	25	0.75	25	NA	NA
226	NA	WP - 08 - 16		2	17.7	0.75	17.7	NA	NA
227	NA	WP - 08 - 18		2	19.8	0.75	19.8	NA	NA
228	NA	WP-09		2	20	0.75	20	NA	NA
229	NA	WP-12	•	2	19.3	0.75	19.3	NA	NA
230	Y	WP-13		2	19.8	1.00	18.35	NA	T
231	NA	WP-14		2	24.1	0.75	24.1	NA	NA
232	N	B - 02	NA		35	0.50	32	NA	A or B
233	N	B - 03	NA		36	0.50	35	NA	A or B
234	. <b>N</b>	B - 04	NA		25.5	0.50	25.6	NA	A or B
235	N	B - 06	NA		31	0.50	30	NA	A or B
236	N	01P		2	NA	0.75	NA	NA	U
237	Y	01X - D		2	NA	1.00	22.57	19-20	U
237	Y	01X-S		2	NA	1.00	12.82	NA	U
, 238	N	01 <b>- Y</b>		2	NA	1.00	7.64	19-20	U
239	N	02P		2	ŅΑ	0.75	NA	NA	U
240	N	02X - D		2	NA	1.00	22.33	19-20	U
240	N	02X - S		2	NA	1.00	16.92	NA	U
241	N	02Y-D		2	NA	1.00	26.75	24-25	บ
241	N	02Y-S		2	NA	1.00	13.38	NA	U
242	N	03P		2	NA	0.75	NA	NA	U

TABLE A-4. MONITORING AND AQUIFER TEST WELL CLOSURE DATA (continued)

Number on Figure 3	'Closure Required	Leakage Status	Minimum Material Volumes (cu ft)	Maximum Material Volumes (cu ft)	Comments
		1	The second second second	Rend Granders and families on the fi	
218	Y	NL	0.0	0.0	Location data unavailable.
219	Y	NL	0.1	0.1	Location data unavailable.
220	, Y	NL	0.1	0.1	Location data unavailable.
221	Υ	NL	0.1	0.1	Location data unavailable.
222	Y	NL	0.1	0.1	Location data unavailable.
223	Y	NL	0.1	0.1	Location data unavailable.
224	Y	NL NL	0.1	0.1	Location data unavailable.
225	Y	NL	0.1	0.1	Location data unavailable.
226	Y	NL	0,1	0.1	Location data unavailable.
227	Y	NL	0.1	0.1	Location data unavailable.
228	Y	NL	0.1	0.1	Location data unavailable.
229	Y	NL	0.1	0.1	Location data unavailable.
230	Y	NL	0.1	0.1	
231	Y	NL	0.1	0.1	Location data unavailable.
232	Y	NL	0.0	0.0	
233	Y	NL	0.0	0.0	
234	Y	NL	0.0	0.0	
235	Y	NL	0.0	0.0	
236	Y	NL	0.1	0.1	
237	Y	NL	0.1	0.1	01X-(D&S) are completed in
237	Y	NL	0.1	0.1	the same boring
238	Y	NL	0.0	0.0	
239	Y	NL	0.1	0.1	
240	Y	NL	0.1	0.1	02X-(D&S) are completed in
240	Υ.	NL	0.1	0.1	the same boring
241	Y	NL	0.1	0.1	02Y-(D&S) are completed in
241	Ÿ	NL	0.1	0.1	the same boring
242	Y	NL	0.1	0.1	·

TABLE A-4. MONITORING AND AQUIFER TEST WELL CLOSURE DATA (continued)

Number on Figures 3a-3c	Located in Area I?	Well Number	Borehole Diameter (inches)	Borehole Depth (feet)	Casing Diameter (inches)	Casing Depth (feet)	Screen Interval (feet)	Probable Completion Zone
243	. <b>N</b>	03W	2	NA	0.75	NA	NA	U
244	N	03X - D	2	NA	1.00	22.54	19-20	U
244	N	03X - S	2	NA	1.00	16.94	NA	U
245	N	03Y-D	2	NA	1.00	17.49	19-20	U
245	N	03Y-S	2	NA	1.00	10.38	NA -	U
246	N	04P	2	NA	0.75	NA	NA	U
247	N	04X – D	2	NA	1.00	22.45	19-20	U
247	Ň	04X - S	2	NA	1.00	16.53	NA	U
248	Y	05P	2	NA	0.75	NA	NA	U
249	N	05W	2	NA	0.75	NA	NA	U
250	N	05Y	2	NA	1.00	22.58	19-20	U
251	N	06X – D	. 2	NA	1.00	22.25	19-20	U
251	N	06X - S	2	NA	1.00	14.42	NA	U
252	N	06Y-D	2	NA	1.00	51	49-50	U
252	N	06Y-M	2	NA	1.00	23	NA	U
252	N	06Y-S	2	NA	1.00	12.38	NA	U
253.	· N	07X - D	2	NA	1.00	21.38	19-20	U
253	N	07X - S	2	NA	1.00	13.77	NA	U
254	N	07Y-D	2	NA	1.00	20.23	19-20	U
254	N	07Y-S	2	NA	1.00	12.34	NA	ָ ับ
255	N	08X - D	2	NA	1.00	21.09	19-20	U
, 255	N	08X - S	2	NA	1.00	9	NÁ	U
256	N	08Y	2	NA	1.00	15.66	19-20	U
257	N	09W	. 2	NA	0.75	NA	NA	U
258	N	09X - D	2	NA	1.00	21.33	19-20	U
258	N	09X - S	2	NA	1.00	11.27	NA	U
259	N	09Y-D	2	NA	1.00	24.52	19-20	U
259	N	09Y-S	2	NA	1.00	5	NA	U

TABLE A-4. MONITORING AND AQUIFER TEST WELL CLOSURE DATA (continued)

Number on Figure 3	Closure Required	Leakage Status	Minimum Material Volumes (cu ft)	Maximum Material Volumes (cu ft)	Comments
243	· Y	- ANL S	0.1	0.1	,
244	Y	NL	0.1	0.1	
244	Y	NL	0.1	0.1	
245	, Y	NL	0.1	0.1	03X-(D&S) are completed in
245	Y	NL	0.1	0.1	the same boring
246	Y	NL	0.1	0.1	03Y-(D&S) are completed in
247	Ϋ́	NL	0.1	0.1	the same boring
247	Ϋ́	NL	0.1	0.1	the same botting
248	Ÿ	NL	0.1	0.1	04X-(D&S) are completed in
249	Ÿ	NL	0.1	0.1	the same boring
250	Ÿ	NL	0.1	0.1	the same botting
251	Y.	NL	0.1	0.1	06X-(D&S) are completed in
251	Y	NL	0.1	0.1	the same boring
252	Y	NL	0.3	0.3	06Y-(D,M&S) are completed in
252	Y	NL	0.1	0.1	the same boring
252	Y	NL	0.1	0.1	
253	Y	NL	0.1	0.1	07X-(D&S) are completed in
253	Y	NL	0.1	0.1	the same boring
254	Y	NL	0.1	0.1	07Y-(D&S) are completed in
254	Y	NL	0.1	0.1	the same boring
255	Y	NL.	0.1	0.1	08X-(D&S) are completed in
255	Y	NL	0.0	0.0	the same boring
256	Y	NL	0.1	0.1	
257	Y	NL	0.1	0.1	
258	Y	NL	0.1	0.1	09X-(D&S) are completed in
258	Y	NL	0.1	0.1	the same boring
259	Y	NL	0.1	0.1	09Y~(D&S) are completed in
259	Y	NL	0.0	0.0	the same boring

TABLE A-4. MONITORING AND AQUIFER TEST WELL CLOSURE DATA (continued)

Number on Figures 3a-3c	Located in Area I?	Well Number	Borehole Diameter (inches)	Borehole Depth (feet)	Casing Diameter (inches)	Casing Depth (feet)	Screen Interval (feet)	Probable Completion Zone
260	Y	10P	2	NA	0.75	NA	NA	U
261	N	10 <b>Y</b>	2		0.75	20	19-20	U
262	N	. 12W	2		0.75	NA	NA	U
263	N	13P	2		0.75	NA	NA	U
264	N	13W	2	NA	0.75	NA	NA	U
265	N	15W	2		0.75	NA	NA	U
266	N	16W	2	NA	0.75	NA	NA	U
267	N	17W	2	NA	0.75	NA	NA	U
268	Y	18P	. 2	NA	0.75	NA	· NA	U
269	N	18W	2	NA	0.75	NA	NA	U
270	N	20 <b>-</b> P	2	NA	0.75	NA	NA	U
271	Y	21 – P	2	NA	0.75	NA	NA	U
272	N	AX	. 2	21.5	0.75	20	19-20	U
273	N	AY	2	21.5	1.00	8.42	19-20	U
274	N	SP-1A	PIT	4.4.	4.00	4.43	NA	U
275	N	SP-1B	PIT	4.3	2.00	4.27	NA	U
276.	· N	SP-3A	PIT	NA	4.00	NA	NA	U
277	N	SP-3B	PIT	NA	0.75	NA	NA	U
278	N	SP-6A	PIT	NA	4.00	NA	NA	U
. 279	Ν.	SP-6B	PIT	NA	0.75	NA ·	NA	U
280	N	SP-8A	PIT	NA	4.00	NA	NA	U
, 281	N	SP-8B	PIT	NA	0.75	NA	NA	U
/ NA	NA	P1-MW	5.3	NA	2 5	-10	NA	U
NA	NA	P2-MW	5.3	NA	2 5	-10	NA	U
NA	NA	P3-MW	5.3	NA	2 5	-10	NA	U
NA	NA	P4-MW	5.3	NA	2 5	-10	NA	U
NA	NA	L1-MW	5.3	NA	2 5	-10	NA	U
NA	NA	L2-MW	5.3		2 5	-10	NA	U

TABLE A-4. MONITORING AND AQUIFER TEST WELL CLOSURE DATA (continued)

Number on Figure 3	Closure Required	Leakage Status	Minimum Material Volumes (cu ft)	Maximum Material Volumes (cu ft)	Comments
260	' Y	NL	0.1	0.1	
261	: <b>Y</b>	NL	0.1	0.1	
262	, Y	NL	0.1	0.1	
263	Y	NL	0.1	0.1	
264	Y	NL	0.1	0.1	
265	Y	NL	0.1	0.1	,
266	Y	NL	0.1	0.1	
267	Y	NL	0.1	0.1	
268	Y	NL	0.1	0.1	
269	Y	NL	0.1	0.1	
270	Y	NL NL	0.1	0.1	
271	Y	NL	0.1	0.1	
272	Y	NL	0.1	0.1	•
273	Y	NL	0.0	0.0	
274	Y	NL	0.4	0.4	
275	Y	NL	0.1	0.1	
276	Y	NL	0.4	0.4	
277	Y	NL	0.0	0.0	
278	Y	NL	0.4	0.4	
279	Y	NL	0.0	0.0	
280	Y	al NL	0.4	0.4	
281	Y	NL	0.0	0.0	
N/A	N	NL		0.22	Location data unavailable.
N/A	N	NL		0.22	Location data unavailable.
· N/A	N	NL		0.22	Location data unavailable.
N/A	N	NL		0.22	Location data unavailable.
N/A	N	NL		0.22	Location data unavailable.
N/A	N	NL		0.22	Location data unavailable.

TABLE A-4. MONITORING AND AQUIFER TEST WELL CLOSURE DATA (continued)

Number on Figures 3a-3c	Located in Area I?	' Well Number	Borehole Diameter (inches)	Borehole Depth (fect)	Casing Diameter (inches)	Casing Depth (feet)	l	Screen Interval (feet)	Probable Completion Zone
NA	NA	L3-MW	5.3	NA		2 5-10		NA	U
NA	NA	L4-MW	5.3	NA		2 5-10		NA	Ū
NA	NA	L1-IN	5.3	NA		2 4-5		NA	U
NA	NA	L1-OUT	5.3	NA		2 4-5		NA	U
NA	NA	L2-IN	5.3	NA		2 4-5		NA	U
NA	NA	L2-OUT	5.3	NA		2 4-5		NA	U
NA	NA	L3-IN	5.3	NA		2 4-5		NA	U
NA	NA	L3-OUT	5.3	. NA		2 4-5		NA	U
NA	NA	L4-IN	5.3	NA		2 4-5		NA	U
NA	NA	L4-OUT	5.3	NA		2 4-5		NA	U
NA	NA	P1-IN	5.3	NA	1.5 & 2	7-8		NA	U
NA	NA	P1-OUT	5.3	NA	1.5 & 2	7-8		NA	U
NA	NA	P2-IN	5.3	NA	1.5 & 2	7-8		NA	U
NA	NA	P2-OUT	5.3	NA	1.5 & 2	7-8		NA	U
NA	NA	P3-IN	5.3	NA	1.5 & 2	7-8		N <b>A</b>	U
NA	NA	P3-OUT	5.3	NA	1.5 & 2	7-8		NA	U
NA .	· NA	P4 – IN	5.3	NA	1.5 & 2	7-8		NA	U
NA	NA	P4-OUT	5.3	NA	1.5 & 2	7-8		NA	U
·NA	$N_{\cdot}$	BLM-1C	6		7	2	7	5-7	U
NA ·	N	BLM-1D	6	2	24	2	24	2-24	U
· NA	N	BLM-2C	6	6	.5	2	6.5	4.5-6.5	U
, NA	N	BLM-2D	6	2	24	2	24	22 - 24	U
NA NA	N	BLM-3C	6		6	2	6	4-6	U
NA	N	BLM-3D	6	2	24	2	24	22 - 24	U
NA	N	BLM-4C	6		6	2	6	4-6	U
NA	N	BLM-4D	6	2	26	2	26	24-26	U
NA	N	BLM-5C	6	6	.5	2	6.5	4.5-6.5	U
NA	N	BLM-5D	. 6	2	25	2	25	23-25	U

TABLE A-4. MONITORING AND AQUIFER TEST WELL CLOSURE DATA (continued)

Number on Figure 3	'Closure Required	Leakage Status	Minimum Material Volumes (cu ft)	Maximum Material Volumes (cu ft)	Comments
		1 - 296111 - 81	1.0000000000000000000000000000000000000	P[000000000000000000000000000000000000	
N/A	, N	NL		0.22	
N/A	N	NL		0.22	·
N/A	, <b>N</b>	NL		0.11	
N/A	, N	NL		0.11	
N/A	N	NL		0.11	Lysimeter
N/A	N	NL		0.11	Lysimeter
N/A	N	NL		0.11	Lysimeter
N/A	N	NL		0.11	Lysimeter
N/A	N	NL		0.11	Lysimeter
N/A	N	NL		0.11	Lysimeter
N/A	N	NL		0.27	Lysimeter
N/A	N	NL		0.27	Lysimeter
N/A	N	NL		0.27	3-Piezometer Nest
N/A	N	NL		0.27	3-Piezometer Nest
· N/A	N	NL		0.27	3-Piezometer Nest
N/A	N	NL NL		0.27	3-Piezometer Nest
N/A	N	NL		0.27	3-Piezometer Nest
N/A	N	NL		0.27	3-Piezometer Nest
N/A	N	NL		0.15	BLM piezometers in BLM test plot, Smelterville Flats.
N/A	N	NL		0.52	BLM piezometers in BLM test plot, Smelterville Flats.
N/A	N	NL		0.14	BLM piezometers in BLM test plot, Smelterville Flats.
N/A	N	NL		0.52	BLM piezometers in BLM test plot, Smelterville Flats.
N/A	N	NL		0.13	BLM piezometers in BLM test plot, Smelterville Flats.
N/A	N	NL		0.52	BLM piezometers in BLM test plot, Smelterville Flats.
N/A	N	NL		0.13	BLM piezometers in BLM test plot, Smelterville Flats.
N/A	N	NL		0.57	BLM piezometers in BLM test plot, Smelterville Flats.
N/A	N	NL NL		0.14	BLM piezometers in BLM test plot, Smelterville Flats.
N/A	N	NL		0.55	BLM piezometers in BLM test plot, Smelterville Flats.

TABLE A-4. MONITORING AND AQUIFER TEST WELL CLOSURE DATA (continued)

Number on Figures 3a-3c	Located in Area I?	Well Number	Borehole Diameter (inches)	Borehole Depth (feet)	Casing Diameter (inches)	Casing Depth (feet)	Screen Interval (feet)	Probable Completion Zone
NA	N	BLM-6C	. 6	6.5	2	6.5	4.5-6.5	U
. NA	N	BLM-6D	6	25.5	2	25.5	23.5-25.5	U
NA	N	BLM-7C	6	7	2	7	5-7	U
NA	N	BLM-7D	- 6	26	2	26	24-26	U
NA	N	BLM-8C	6	7	2	7	5-7	U
NA	N	BLM-8D	6	26	2	26	24-26	U
NA	N	BLM-9C	6	6	2	6	4-6	U
NA	N	BLM-9D	6	6.5	2	6.5	4.5~6.5	U
NA	N	BLM-10C	6	6.5	. 2	6.5	4.5-6.5	. U
NA	N	BLM-10D	6	25.5	2	25.5	23.5-25.5	U
NA	N	TYPE B	10	24	2	24	4-24	U
NA	N	MP1A	10	26	2	25	23-24	U
NA	N	MP1B	10	42	. 2	42	40-41	С
NA	N	MP1C	10	62	2	62	60-61	С
NA	N	MP1D	10	102	2	94	92-95	L
NA	N	MP2A	10	24	2	24	22-23	U
NA .	· N	MP2B	10	41	2	40	39-40	С
NA	N	MP2C	10	61	2	60	59-60	С
NA	N	MP2D	10	100	2	93	92-97	L
NA ·	N	P1	10	110	2	108	87-103	L
· NA	N	P-101	8.5	12	2	10	5-10	U
, NA	N	P-102	8.5	12	2	10	5-10	U
NA NA	N	P-103	8.5	12	2	10	5-10	U
NA	N	P-104	8.5	12	2	10	5-10	U
NA	N	GR-26UD	8.5	40	2	35	25-35	U
NA	Y	GR-44UD	8.5	23	2	20	15-20	Ü
NA	Ÿ	GR-101	8.5	27	2	26	16-26	Ū
NA	N	GR-102	8.5	25	2	15	5-15	U

TABLE A-4. MONITORING AND AQUIFER TEST WELL CLOSURE DATA (continued)

Number on	Closure	Leakage	Minimum Material Volumes	Maximum Material Volumes	
Figure 3	Required	Status	(cu ft)	(cu ft)	Comments
N/A	, N	[ TO NE TO	150000000000000000000000000000000000000	0.14	DIM to the second DIM to the Control of the Control
N/A N/A		NL		0.14	BLM piezometers in BLM test plot, Smelterville Flats.
	N N			\$10000000 a \$100000000 a a a a a a a a a a a a a a a	BLM piezometers in BLM test plot, Smelterville Flats.
N/A	; N	NL		0.15	BLM piezometers in BLM test plot, Smelterville Flats.
N/A	. 11	NL		0.57	BLM piezometers in BLM test plot, Smelterville Flats.
N/A	N	NL		0.15	BLM piezometers in BLM test plot, Smelterville Flats.
N/A	N	NL		0.57	BLM piezometers in BLM test plot, Smelterville Flats.
N/A	N	NL		0.13	BLM piezometers in BLM test plot, Smelterville Flats.
N/A	N	NL		0.14	BLM piezometers in BLM test plot, Smelterville Flats.
N/A	N	NL		0.14	BLM piezometers in BLM test plot, Smelterville Flats.
N/A	N	NL		0.56	BLM piezometers in BLM test plot, Smelterville Flats.
N/A	N	NL		0.52	
N/A	N	NL		0.55	
N/A	N	NL		0.92	
N/A	N	NL		1.35	4-Piezometer Nest, located on Smelterville Flats.
N/A	N	PL		2.05	4-Piezometer Nest, located on Smelterville Flats.
N/A	N	NL		0.52	4-Piezometer Nest, located on Smelterville Flats.
N/A	N	NL		0.87	4-Piezometer Nest, located on Smelterville Flats.
N/A	N	NL		1.31	4 - Piezometer Nest, located on Smelterville Flats.
N/A	N	PL		2.03	4 - Piezometer Nest, located on Smelterville Flats.
N/A	N	PL		2.36	4-Piezometer Nest, located on Smelterville Flats.
N/A	N	NL		0.22	Installed September, 1991
N/A	N	NL		0.22	Installed September, 1991
N/A	N	NL		0.22	Installed September, 1991
N/A	N	NL		0.22	Installed September, 1991
N/A	N	NL NL		0.76	Installed September, 1991
N/A	N	NL NL		0.44	•
N/A	N	NL NL		0.57	Installed September, 1991
N/A	N	NL NL		0.33	Installed September, 1991
14/14	14	IN T	[	v.ɔɔ	Installed September, 1991

TABLE A-4. MONITORING AND AQUIFER TEST WELL CLOSURE DATA (continued)

Number on Figures 3a-3c	Located in Area I?	Well Number	Borehole Diameter (inches)	Borchole Depth (feet)	Casing Diameter (inches)	Casing Depth (feet)	Screen Interval (feet)	Probable Completion Zone
NA	N	GPT-1L	12	93	8	93	64-88	L
NA NA	N	GPT-1U	10	32	8	21.7	17-27	U
NA NA	Y	GPT-10	12	95	8	100	76.5-95	L
NA NA	Y	GPT-2U	10	24	6	24	9-19	บ
NA NA	· N	GR-1LD	6	83	2	83	82-83	L
NA NA	N	GR-1LS	6	62	2	62	61-62	L
NA NA	N	GR-1UD	7.5	24	2	24	23-24	Ü
NA	N	GR-1US	7.5	14.5	2	14.5	13.5-14.5	Ü
NA ·	N	GR -4	7.5 7.5	20.5	2	20.5	15.5-20.5	Ŭ
NA NA	N	GR-18	7.5	20.3	2	20.3	15.5 20.5	Ŭ
NA	N	GR-25	7.5	21	2	21	16-21	Ŭ
NA	N N	GR-26L	6	105	2	105	100-105	Ĺ
NA	N	GR-26US	7.5	20	2	20	15-20	Ū
NA	N	GR -27	7.5	21	2	21	16-21	Ü
NA	Y	GR-28	7.5	19.5	2	19.5	14.5-19.5	Ū
NA	Ÿ	GR-29	7.5	17	2	17	12-17	Ū
NA .	N	GR-31	7.5	19		19	14-19	Ū
NA	Y	GR-44US	7.5	21.5	2 2	21.5	16.5-21.5	U
NA	N	P-1	7.5	8	2	. 8	4-8	U
NA	N	P-2	7.5	8	2	8	3-8	U
· NA	N	P-3	7.5	12	2	12	6-12	U
, NA	N	GR-3	7.5	23	2	23	18-23	U
NA NA	N	GR-5	7.5	69	2	69	64-69	U
NA	N	GR-6G	7.5	24.5	2	24.5	19.5-25.5	G
NA	N	GR-6T	7.5	55	2	55	50-55	T
NA	N	GR-6U	7.5	71.5	2	71.5	66.5-71.5	U
NA	N	GR-8	7.5	21.5	2	21.5	16.5-21.5	U
NA	N	GR-9T	7.5	42.5	2	42.5	37.5-42.5	G

TABLE A-4. MONITORING AND AQUIFER TEST WELL CLOSURE DATA (continued)

Number on Figure 3	'Closure Required	Leakage Status	Minimum Material Volumes (cu ft)	Maximum Material Volumes (cu ft)	Comments
N/A	, N	[ATTINLA D	[]	32.47	Grouted in 1989 due to broken casing.
N/A	; N	NL		7.58	ordated in 1707 due to ordate during.
N/A	, N	PL		34.91	
N/A	N	NL		4.71	
N/A	N	PL		1.81	
N/A	N	PL		1.35	
N/A	N	NL		0.52	
N/A	N	NL		0.32	
N/A	N	NL		0.45	
N/A	N	NL NL		0.44	
N/A	N	NL		0.46	
N/A	N	PL		2.29	
N/A	N	NL NL		0.44	
N/A	Ν.	NL		0.46	
N/A	N .	NL		0.43	
N/A	N	NL		0.37	Suface casing welded closed
N/A	N	NL		0.41	
N/A	N	NL		0.47	
N/A	N	NL		0.17	
N/A	N	NL		0.17	
N/A	N	NL		0.26	
N/A	N	NL		0.50	•
N/A	N	NL		1,51	
N/A	. <b>N</b>	NL		0.53	
N/A	N	NL		1.20	
N/A	N	NL		1.56	
N/A	N	NL		0.47	
N/A	N	NL		0.93	

TABLE A-4. MONITORING AND AQUIFER TEST WELL CLOSURE DATA (continued)

Number on Figures 3a-3c	Located in Area I?	Well Number	Borehole Diameter (inches)	Borehole Depth (feet)	Casing Diameter (inches)	Casing Depth (feet)	Screen Interval (feet)	Probable Completion Zone
NA	N	GR-9U	7.5	72	2	. 72	67~72	U
NA	N	GR-10T	7.5	53	2	53	48-53	T
NA	N	GR-10U	7.5	61	2	61	56-61	U
NA	N	GR-11L	6	111	2	111	106-111	L
NA	N	GR-11LP	6	87	2	87	81-87	
NA	N	GR-11T	7.5	49	2	49	44-49	T
NA	N	GR-11TS	7.5	44	2	44	39-44	T
NA	N	GR-11U	7.5	63	2	63	58-63	U
NA	N	GR-13T	7.5	. 52	2	52	47-52	T
NA	N	GR-13U	7.5	58	2	58	53-58	U
NA	N	GR-45	7.5	66	2	66	61-66	U
NA	N	GR-46	7.5	. 19	2	19	14-19	U
NA	N	GR-50	7.5	. 17	2	17	12-17	U
NA	N	GR-52L	6	73	2	73	68-73	L
NA	N	GR-52U	7.5	20	2	20	15-20	U
NA	N	GR-53L	· 6	71	2	71	66-71	L
NA .	· N	GR-54	7.5	20	2	18	13-18	U
NA	N	GR-55	7.5	19.5	2	18.5	13.5-18.5	U
NA	N	GR-56D	7.5	26.5	2	21.5	19-21.5	U
NA ·	N	GR-56S	7.5	16	2	16	13.5-16	U
· NA	N	GR-57	7.5	18	2	18	13-18	U
, NA	N	GR-58D	7.5	22	2	20	17.5-20	U
NA	N	GR-58S	7.5	14	2	13.5	11-13.5	U
NA	N	GR-59	7.5	19.5	2	19	14-19	U
NA	· N	GR-60	7.5	18.5	2	17	12-17	Ü
NA	Y	GR-21L	7.5	116.5	2	116	111.5-116.5	L
NA	Y	GR-21T	7.5	19.5	2	19.5	14.5-19.5	T
NA	Y	GR-21U	7.5	39.5	2	39.5	34.5-39.5	U

TABLE A-4. MONITORING AND AQUIFER TEST WELL CLOSURE DATA (continued)

Number on Figure 3	'Closure Required	Leakage Status	Minimum Material Volumes (cu ft)	Maximum Material Volumes (cu ft)	Comments	
			• Contract of the Contract of	Marchaelle att. date i version d		
N/A	, N	NL		1.57		•
N/A	N	NL %		1.16		
N/A	, <b>N</b>	NL		1.33		
N/A	N	PĽ		2.42		
N/A	N	PL		1.90		
N/A	N	NL		1.07		
N/A	N	NL		0.96		
N/A	N	NL NL		1.37		
N/A	N	NL		1.13		
N/A	N	NL		1.27		
N/A	N	NL		1.44		
N/A	N	NL		0.41		
N/A	N	NL		0.37		
N/A	N	PL		1.59		
N/A	N	NL		0.44		
N/A	N	PL		1.55		
N/A	N	NL		0.39		
N/A	N	NL		0.40		
N/A	N	NL		0.47		
N/A	N	NL		0.35		
N/A	N	NL		0.39		
N/A	N	NL		0.44	•	
N/A	N	NL		0.29		
N/A	N	NL		0.41		
N/A	N	NL		0.37		
N/A	N	PL		2.53		
N/A	N	NL		0.43		
N/A	N	NL		0.86		

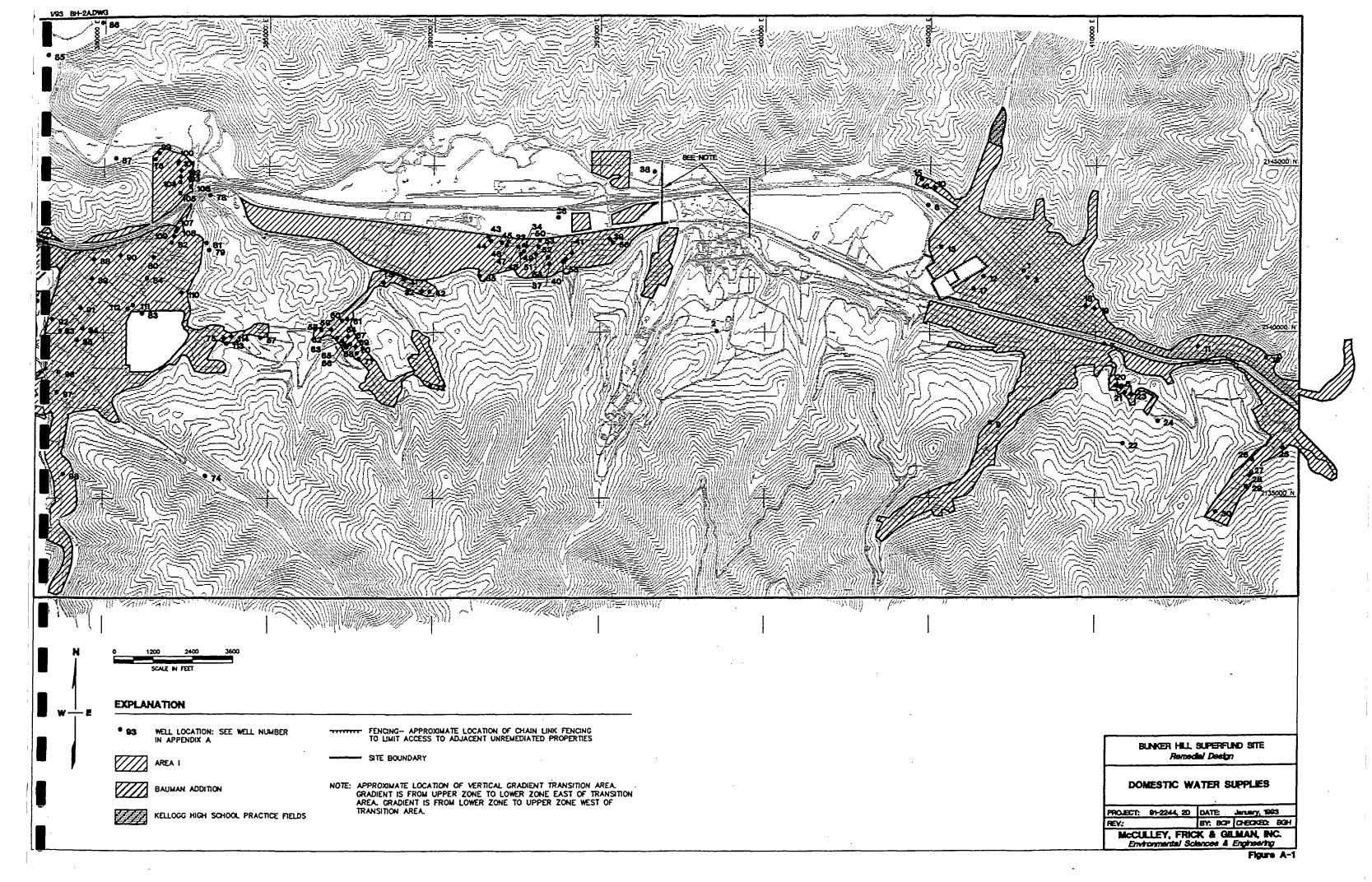
TABLE A-4. MONITORING AND AQUIFER TEST WELL CLOSURE DATA (continued)

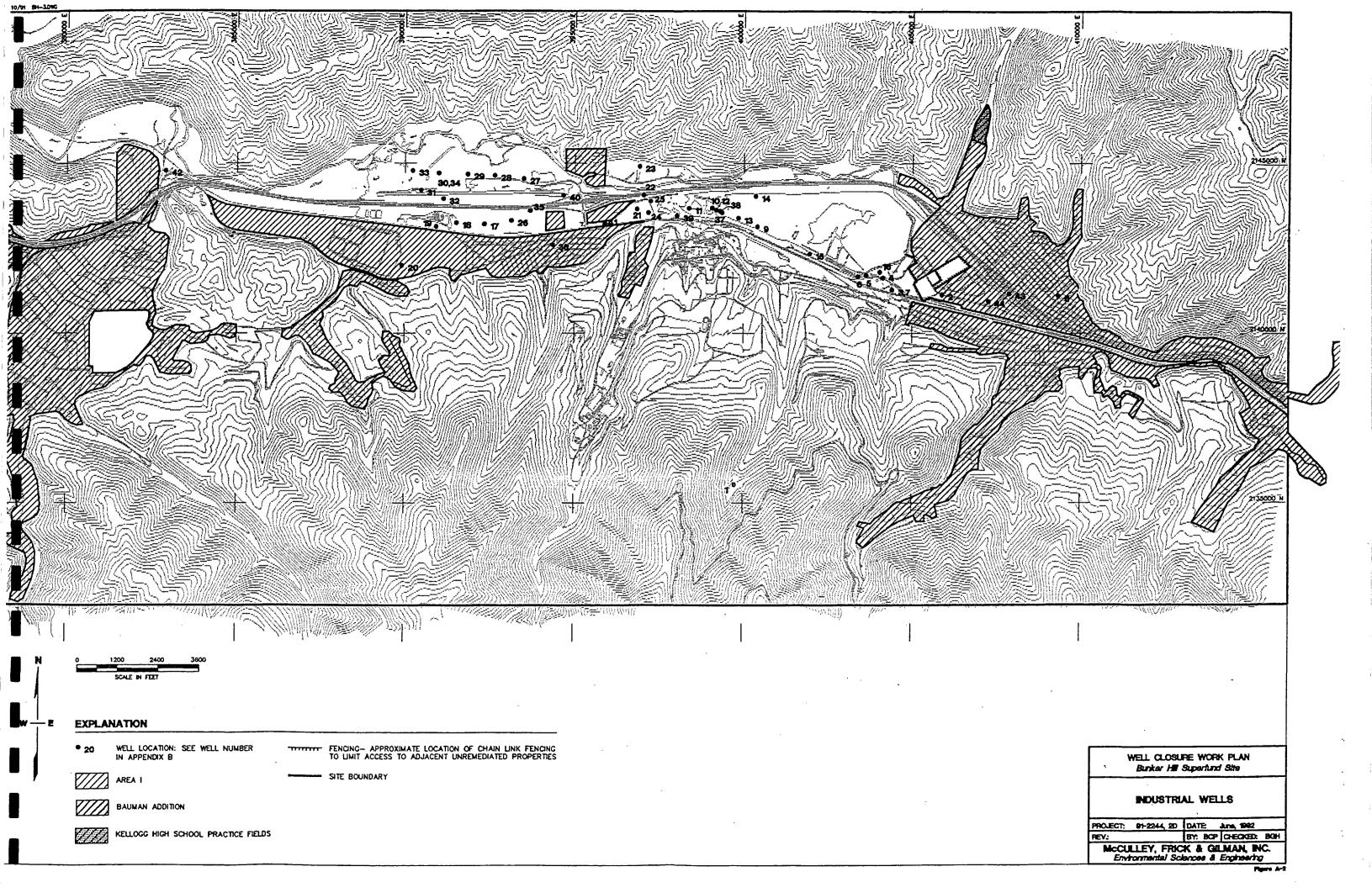
Number on Figures 3a-3c	Located in Area I?	Well Number	Borehole Diameter (inches)	Borehole Depth (feet)	Casing Diameter (inches)	Casing Depth (feet)	Screen Interval (feet)	Probable Completion Zone
	· · · · · · · · · · · · · · · · · · ·					· · · · · · · · · · · · · · · · · · ·		
NA	Y	GR-32D	7.5	65.5	2	65.5	55.5-65.5	DA ·
NA	Y	GR-32S	7.5	28.5	2	28.5	23.5-28.5	SA
NA	N	GR-33	7.5	29	2 .	29	24-29	Α
NA	N .	√ GR-34	7.5	8	. 2	8	4-8	S
NA	N	GR-36	7.5	22.5	2	22.5	18.5-22.5	Α
NA	N	GR-37	7.5	17.5	2	17.5	12.5-17.5	Α
NA	N	GR-38	7.5	5	2	5	4-5	S
NA	N	GR-39	7.5	60	2	60	55-60	Α
NA	N	GR-40	7.5	40	2	40	35-40	S
NA	N	GR-41	7.5	8.5	2	8.5	5-8.5	S
NA	N	GR-47	7.5	18.5	2	18.5	13.5-18.5	Α
NA	N	GR-48	7.5	22.5	2	22.5	17.5-22.5	Α
NA	N	B (Shallow)	. 8	41	2	41	36-41	S
NA	N	B (Deep)	8	65	2	62.2	57.2-62.2	S
NA	N	C	8	48	2	47	37-47	S

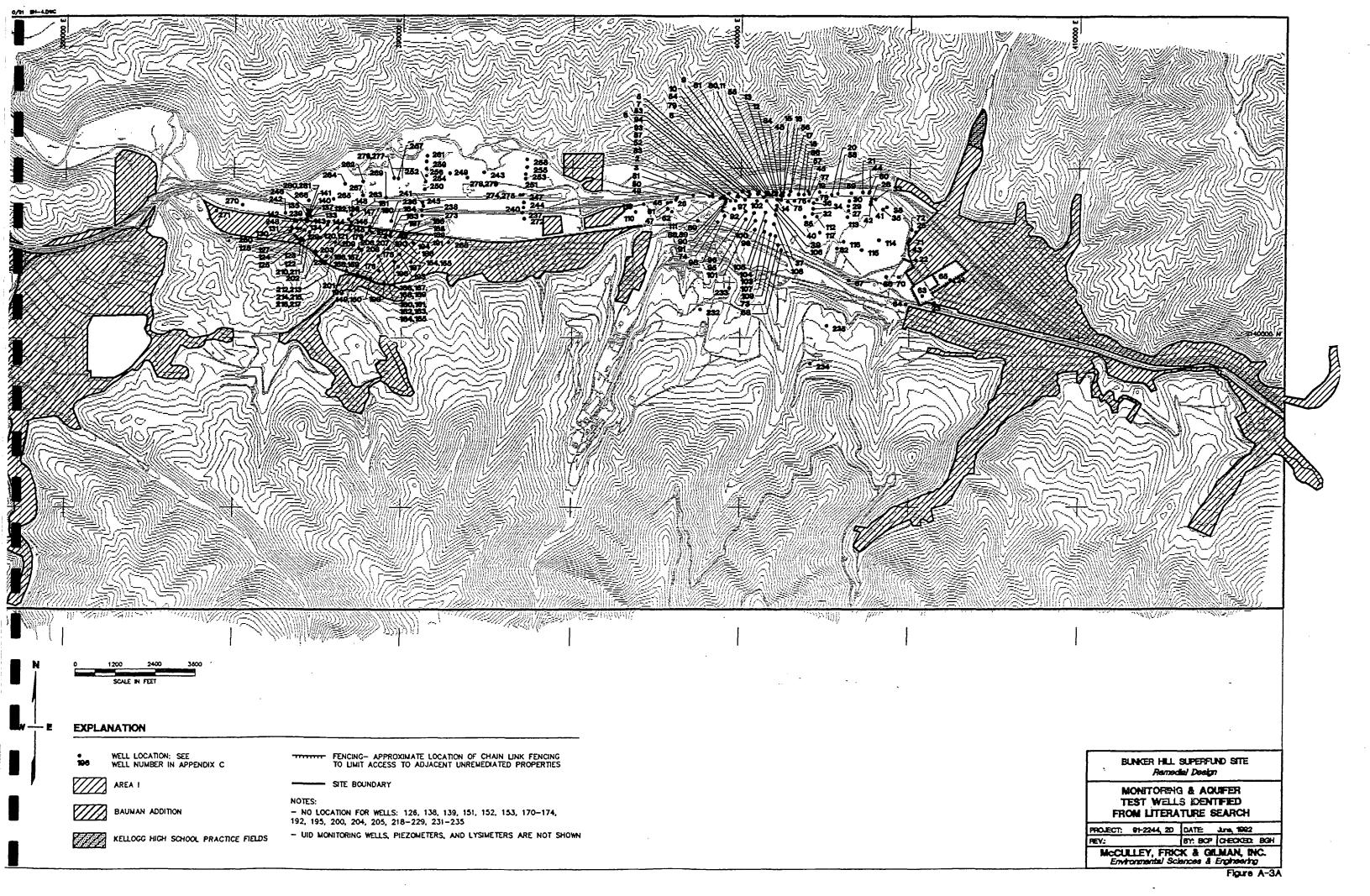
TOTALS: 463

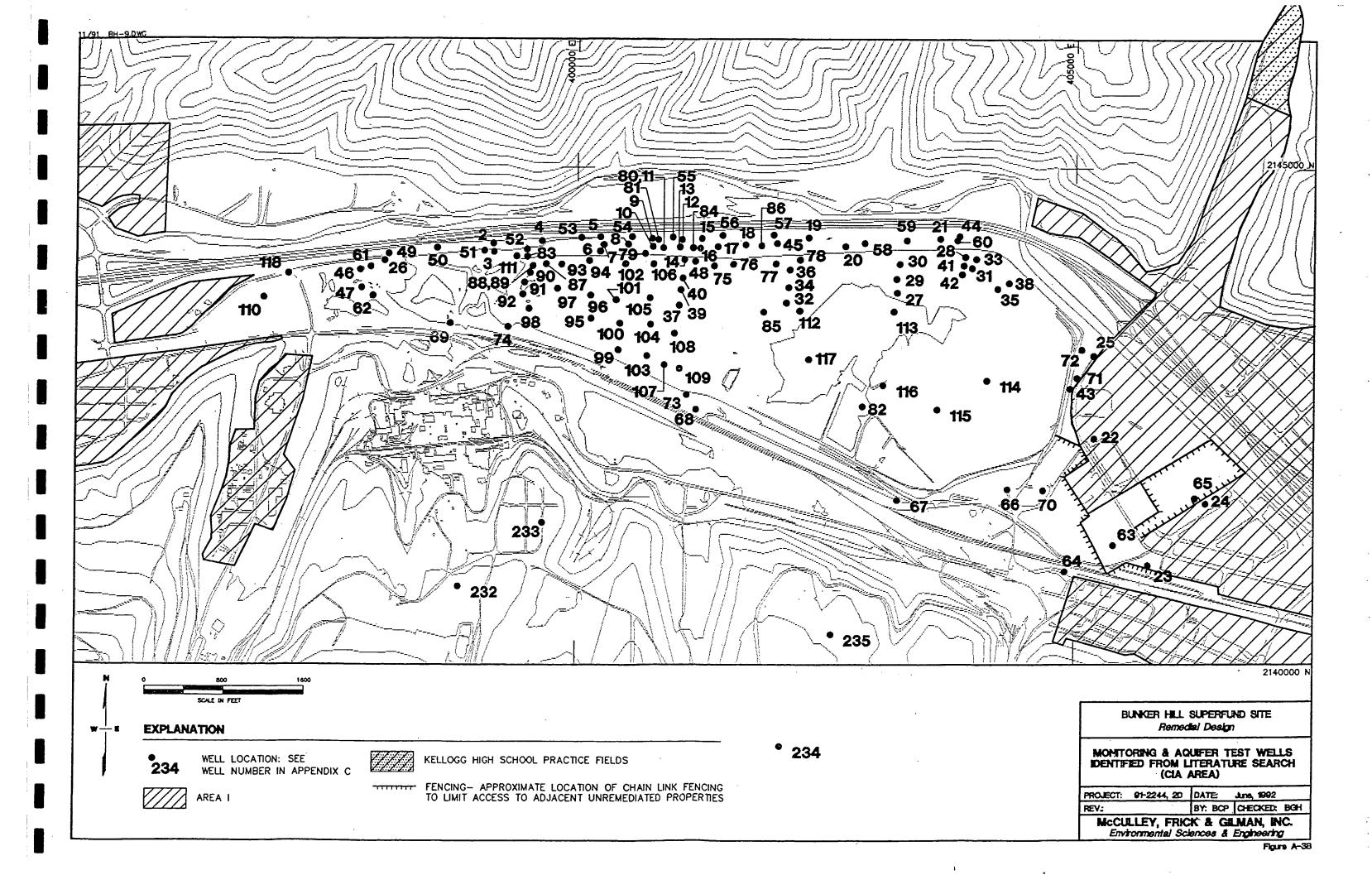
# TABLE A-4. MONITORING AND AQUIFER TEST WELL CLOSURE DATA (continued)

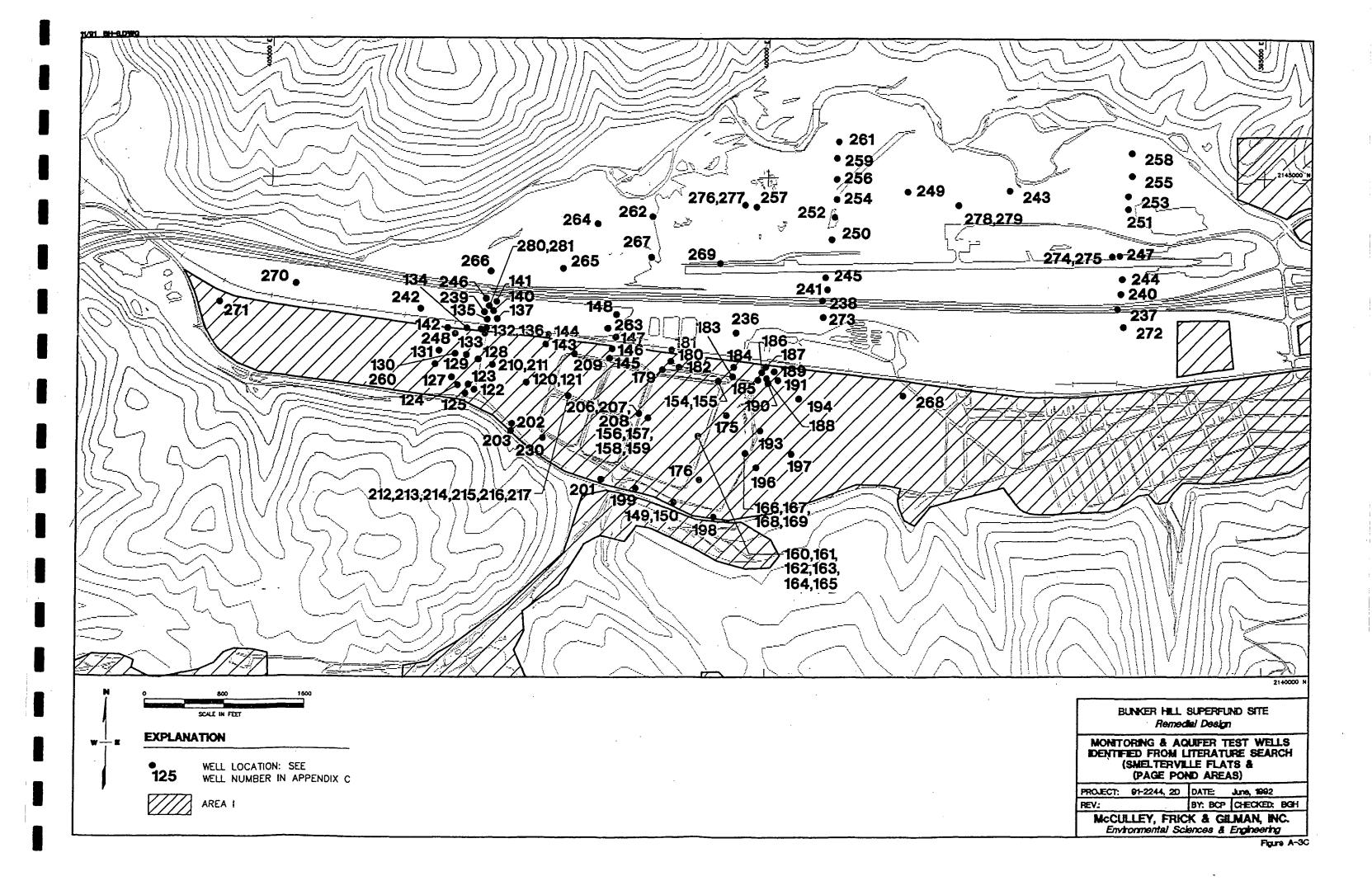
	Number on Figure 3	'Closure Required	Leakage Status	Minimum Material Volumes (cu ft)	Maximum Material Volumes (cu ft)	Comments
	N/A	' N N N N N N N N N N	NL N		1.43 0.62 0.63 0.17 0.49 0.38 0.11 1.31 0.87 0.19 0.40 0.49 0.89 1.36 1.03	Installed 10/14/90 Installed 10/14/90 Installed 10/14/90
TOTALS:	463	Y = 317 N = 146	NL = 441 PL = 22		860,500 : 61 : 1180,418,610,610 - 440, 80,00,610,61	(cubic feet) (cubic yards)
/	Notes:		T = Flotation Tailings F = Fill Material G = Gypsum A = Alluvium S = Surficial B = Bedrock U = Upper Zone C = Confining Zone	SA = Shallow DA = Deep A BH = Bunker NA = Data No NL = Non-Lo PL = Potentia Y = Yes N = No	lluvium Hill ot Available	Page 24 of 24

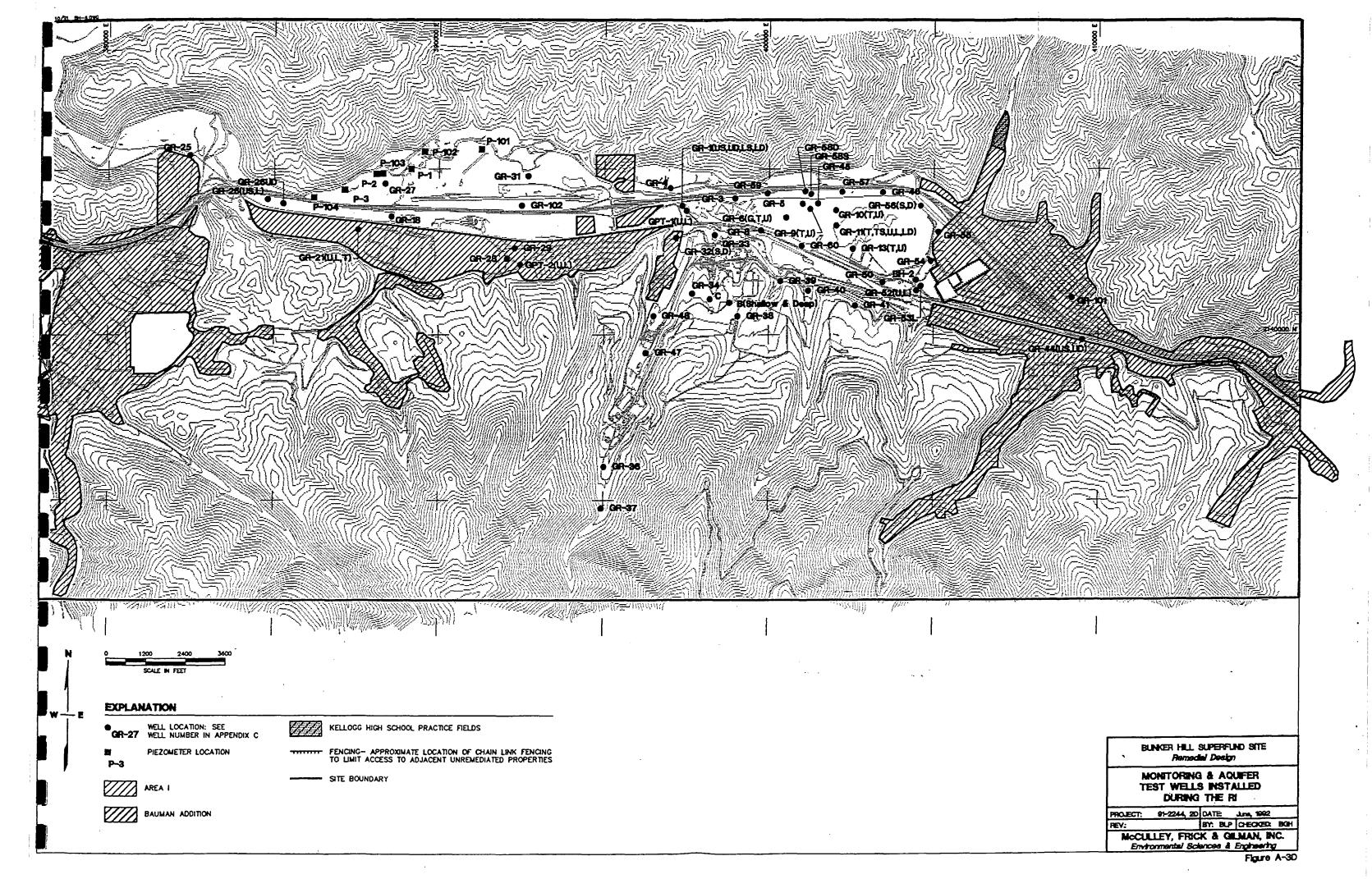












APPENDIX B

# APPENDIX B

WORK PLANS AND FORMS
TO BE USED DURING WELL-CLOSURE ACTIVITIES

# WORK PLAN

WELL OWNER SURVEY TO SUPPORT THE WATER WELL CLOSURE REMEDIAL DESIGN REPORT

#### WORK PLAN

#### WELL OWNER SURVEY TO SUPPORT THE WATER WELL CLOSURE REMEDIAL DESIGN REPORT

#### 1.0 PURPOSE AND SCOPE

Section 9.2.11 of the Record of Decision (ROD) for the Bunker Hill Mining and Metallurgical Complex mandates that "...all ground water wells within the Site that are in the main valley aquifer, either upper zone, lower zone, or other contaminated wells within the Site will be closed or abandoned according to the State of Idaho Requirements." Closure of water wells within the site is addressed in the Water Well Closure Remedial Design Report (RDR). Information in the RDR is compiled from two well surveys previously conducted at the Bunker Hill Site:

- Pintlar Corporation, 1991, Water Source Survey Report; Unpublished, Dated March 26, 1991; and
- Dames & Moore, 1989, Bunker Hill Site RI/FS, Subtask 3.1, Technical Memorandum: Inventory of Wells (Revised); Document Number 15852-PD012/31020.

The former document provides the results of an extensive door-to-door survey wherein well owners were interviewed to obtain well location and construction details. The document includes a series of large-scale (1"=100') maps showing the locations of water wells, as located in the field. The Dames & Moore report provides the results of a well survey based on the records of the Idaho State Engineer's office.

The Water Well Closure RDR identifies wells that require closure because they are known to be screened in ground-water units containing metals concentrations in excess of Federally-promulgated drinking water standards. As noted in the RDR, well completion details, such as well depth and/or position of the well intake screen, are unknown for some wells. In these instances, the

### **DRAFT**

potential for withdrawing ground water contaminated with metals from mining-related sources is unknown. Such wells have been categorized as possibly requiring closure, pending collection of information necessary to make closure evaluations. Other wells categorized as possibly requiring closure are those reportedly used solely for irrigation purposes.

The purpose of this work plan is to describe a well owner survey that will be conducted to poll the owners of domestic wells identified as requiring or possibly requiring closure. Information collected during this survey will augment that collected by Pintlar Corporation in 1991, with respect to:

- additional data regarding well construction, such as completion depth, where such information is currently unavailable;
- access conditions to the well head that could be problematic for well-closure crews and equipment; and
- the possible presence of previously unreported secondary potable water sources that could eliminate the need for a new tie-in to a municipal water system;

The additional well construction information will be considered in conjunction with previously gathered hydrogeological and hydrogeochemical data to establish the necessity decommissioning wells identified as possibly requiring closure. irrigation wells, the well owner survey will provide information confirming that the well is used only for irrigation, and not for domestic use.

This document is one of two work plans prepared to describe field activities supporting the Water Well Closure RDR. The companion work plan describes a ground-water sampling and analysis program designed to assess the need, if any, for well closures in the Pinehurst and Page populated areas. EPA and IDHW will be

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notified prior to commencing the well owner survey and the waterquality sampling activities outlined in these two work plans.

#### 2.0 METHODS

The South Fork Coeur d'Alene River valley, in and adjacent to the towns of Kellogg and Smelterville, contains domestic wells that have been identified as requiring closure or possibly requiring closure due to their potential for withdrawing ground water containing metals in excess of Federal drinking water standards. These wells are listed in Table 1 (attached). The well locations are shown on Figure 1 (attached). All of the wells listed on Table 1 are located within Area I of the Bunker Hill Superfund Site. Figure 1 depicts all domestic wells within the Bunker Hill Site (both within and outside of Area I) requiring or possibly requiring closure.

As noted in the Water Well Closure RDR, the owners of wells listed on Table 1 will be contacted by letter to initiate the survey. An example of this letter is provided as Attachment 1. The mailing will be followed by telephone contact with individual well owners after approximately one week to establish personal contact, respond to any outstanding concerns, and arrange a time for a visit to examine the well and collect additional information. After letter have been distributed to the well owners listed on Table 1, a notice will be included in the local newpaper(s) which describes the need for selected well closures within the site. This public notice will include an invitation for well owners to contact the project office in the event they are not contracted by well closure personnel. This may result in identification of previously unknown wells that require closure.

Field crews who visit well owners will be equipped with questionnaires (example attached). The questionnaires will be filled out by field crews prior to each visit, to the extent possible based on available records. During each field visit, crews will verify the previously recorded information, note discrepancies, and record new information, as appropriate. Also,

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access conditions to each well head will be noted, each well will be photographed, and the depth to water and bottom of each well will be measured (if feasible). All work will be performed in accordance with the substantive requirements of the Bunker Hill Site RI/FS Health and Safety Plan.

#### 3.0 SCHEDULE

As previously noted, this document is one of two work plans prepared to describe field activities supporting the Water Well Closure RDR. The ground-water sampling and analysis program described in the companion work plan is designed to assess the potential need for well closures in the Pinehurst and Page areas. The survey described herein may need to be distributed to the owners of wells in the Pinehurst and Page areas, depending on the results of the ground-water sampling and analysis program. Therefore, the well owner survey should be distributed after collection and evaluation of the ground-water-quality information to increase project efficiency.

The activities described in this work plan will commence after approval of the plan by EPA and after ground-water-quality conditions in Pinehurst and Page have been characterized. EPA and IDHW will be notified prior to commencing the well owner survey. Assuming that wells in Pinehurst and Page do not require closure, preparatory activities, including distribution of mailings, are expected to require two days to complete. Survey activities are expected to require five days to complete, but are dependent on well owner response and participation. Evaluation of the field survey results is expected to require an additional two to three days. Should all wells in Pinehurst and Page require closure, the time frame for the well survey activities could increase by a factor of three.

#### 4.0 PRESENTATION OF RESULTS

Pertinent results of the field work described in this work plan will be included in Residential Areas Annual Remedial Action Work Plans, when applicable.

#### ATTACHMENT 1

Dear

This letter has been sent to you because, according to our records, you are the owner of a water well. The approximate location of this well is shown by number \_\_\_\_\_ on the attached map. The purpose of this letter is to request that you participate in a survey to provide information regarding your well. This information is requested to support the general remedial activities occurring in the Bunker Hill Superfund Site. A component of the remedy for the Bunker Hill site, as described in EPA's 1992 Record of Decision, is closure of domestic wells due to the potential for these wells to withdraw ground water containing concentrations of some metals in excess of Federal drinking water standards. Our studies indicate that ground water withdrawn by your well may exceed drinking water standards for \_\_\_\_\_.

Please note that, at a later date, you may be asked to allow your well to be closed, at no expense to you. Existing domestic wells serving as the sole water supply for a residence will be replaced by a tie-in to a municipal water supply, again at no expense to the well owner.

We respectfully request the opportunity to examine your well. The purpose of the examination is to collect information about the well, such as depth to water, total depth of the well, and well construction details. We would also like to examine access conditions to the well head. You will be contacted in approximately one week by \_\_\_\_\_\_\_ to discuss any questions you may have about this program and to arrange a time when your well can be examined. In the interim, you may contact with any concerns.

Thank you very much for your time.

Sincerely yours,

TABLE 1
Well Owner Survey

Well Number	Ownership/Address	Hole	Hole	Casing	Casing	Comments
In RDR		Diameter	Depth	Diameter	Depth	
No. 3	Stein Bros., Inc.	8"	65'	6"	64'	Secondary water supply
	P.O. Box 165					Garden Spot IGA
	Kellogg, Id. 83837					
	(208) 784-1122					
No. 10	H. McCreary	NA	60'	NA	60'	Water quality
	900 W. Cameron Ave.					data available
	Kellogg, Id. 83837					Domestic use
	(208) 786-0591					
No. 11	R. Dalton	10"	41'	10"	41'	Well destroyed
	P.O. Box 313					
	Osburn, Id. 83849					
N7 44	(208) 556-2973		64-			T
No. 12	Bud Deeder	8"	74'	6"	74'	Irrigation well for
	7 Diamond Ave.					common use
	Kellogg, Id. 83837					between owners
N- 10	(208) 786-3071	27.4	N7.4	3.7.4		Turing H
No. 13	School Dist. 391	NA	NA	NA	NA	Irrigation well
	800 Bunker Ave.					
	Kellogg, Id. 83837					
	(208) 784-1348					
No. 14	Dante Bisaro	NA	41'	NA	NA	Domestic use
	124 Cathryn Ave.					
	Kellogg, Id. 83837	٠		•		
	(208) 783 – 5001				<b></b>	7
No. 15	James Keller	NA	NA	NA	NA	Irrigation well
	Freeport Indonesia, Inc.					Contact Jim Currie
	P.O. Box 616					(208) 682-3030
	Cairns, Queensland 4870					
	Australia					
\;\	NA NA	27.4			F 6.	Y **
No. 17	Virgil McKenzie	NA	ΝA	5"	55'	Irrigation well
	204 Emerald Dr.					
	Kellogg, Id. 83837					
N- 10	(208) 784-6041	N7.4	N7 4	O#	(7)	Co V/man 3 - D1111
No. 18	Richard Schrieber	NA	NA	8"	67'	St. Vincent de Paul bldg.
	409 Emerald Dr.					Commercial use
	Kellogg, Id. 83837					
NI- 10	(208) 784–6601		NT 4	NT A	NT 4:	Y-1-41
No. 19	Joyce Chaffee	NA	NA	NA	NA	Irrigation well
	126 E. Mullan					
	Kellogg, Id. 83837				•	
N/c 00	(208) 786-8581	· · ·	963	4 11	001	Well not in sec
	E. Siler	6"	86'	4"	80'	Well not in use
	P.O. Box 100					Located in scrap yard
	Smelterville, Id. 83868					_
	(208) 786-6551					

TABLE 1
Well Owner Survey

Well Number	Ownership/Address	Hole	Hole	Casing	Casing	Comments
In RDR		Diameter	Depth	Diameter	Depth	
No. 34	E. Siler	6"	78'	6"	80'	Domestic use
	P.O. Box 100					
	Smelterville, Id. 83868					
	(208) 786-6551					
No. 35	Brent Van Vleet	6"	200'	6"	35'	Domestic use
	702 N. Howard					Boat Restaurant
	Kellogg, Id. 83837			•		
	(208) 784-0141	··				
No. 39	City of Smelterville	NA	NA	4"	95'	Irrigation well
	Box 200					
	Smelterville, Id. 83868					
 	(208) 786-3351					
No. 40	Charles Atha	6"	28'	6"	22'	Irrigation well
	Box 386		•			· ·
	Smelterville, Id. 83868		•			
	(208) 784-5171					
No. 43	Wallace/Colville	NA	NA	6"	80'	Domestic use
	Auto Freight			_		
	400 Sycamore					,
	Spokane, Wa. 99201					
	(509) 535-2986					
No. 44	Earl Siler	NA	NA	.6"	80'	Domestic use
•	P.O. Box 100					
	Smelterville, Id. 83868					
	(208) 786-6551					·
No. 45	Earl Siler	NA	NA	4"	80'	Domestic use
	P.O. Box 100					•
	Smelterville, Id. 83868					
	(208) 786-6551					
No. 46	Earl Siler	NA	NA	6"	80'	Vacant lot
	P.O. Box 100					Well not in use
	Smelterville, Id. 83868					
<del></del>	(208) 786-6551		·			
No. 47	Roy Nickerson	NA	NA	6"	59'	Domestic use
	P.O. Box 519					
	Smelterville, Id. 83868					
	(208) 682-2651					
No. 48	Mark Dane	NA	NA	NA	NA	Domestic use
	3907 Belmont					
	Coeur d'Alene, Id. 83814				<b>v</b> .	
	(208) 682-2651					* * *
No. 49	Earl Siler	NA	NA	6"	80'	Irrigation well
	P.O. Box 100					
	Smelterville, Id. 83868					_
	(208) 786–6551					

TABLE 1
Well Owner Survey

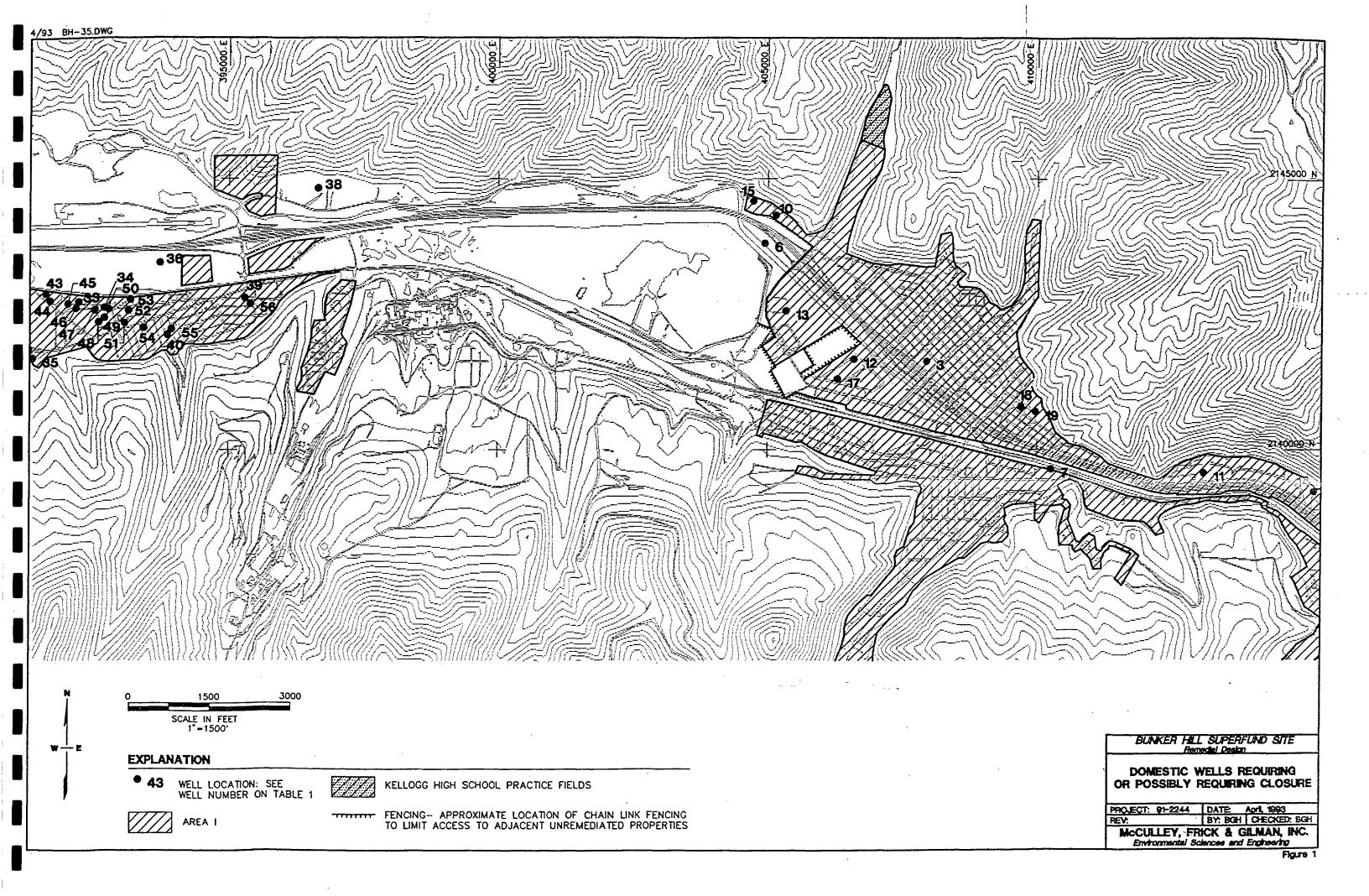
Well Number	Ownership/Address	Hole	Hole	Casing	Casing	Comments
In RDR	_	Diameter	Depth	Diameter	Depth	
No. 50	Bud Elston	NA	NA	6"	13'	Well not used
	P.O. Box 52					
	Smelterville, Id. 83868					
	NA				<del></del>	
No. 51	Albert Reed	NA	NA	6"	26'	Well not used
<b>J</b>	P.O. Box 30					Reed's Motel
	Smelterville, Id. 83868					
	(208) 786-6252	•				
No. 52	Bennie Bachmeier	NA	NA	6"	26'	Irrigation well
	P.O. Box 183					
	Smelterville, Id. 83868					-
	(208) 786-6691					
No. 53	Marie C. Cowen	NA	NA	6"	25'	Well not used
{	P.O. Box 265					
	Silverton, Id. 83867					
	(208) 752-8741					
No. 54	Roy Nickerson	NA	NA	6"	58'	Commercial well
	P.O. Box 519					Nickerson's Car Agency
	Smelterville, Id. 83868					
	(208) 682-2651					
No. 55	James Foley	NA	NA	6"	26'	Irrigation well
	P.O. Box 117					
	Smelterville, Id. 83868					
	(208) 784-7061	· · · · · · · · · · · · · · · · · · ·		<del></del>		
No. 56	Bennie Bachmeier	NA	NA	6"	55'	Irrigation well
	P.O. Box 183					
	Smelterville, Id. 83868					
	(208) 786-6691					•

# QUESTIONNAIRE FOR DOMESTIC WATER WELL OWNERS Page 1 of 2

Well Owner:	Intervie	wer:
Name Address	Name Date Compar	
Phone ( )		
	Well Completion Details:	
Well Depth	Screened Interval	Date Drilled
Casing Depth	Casing Type	
Formation In Which Well Was Co		
Borehole	Casing	Drilling
Diameter	Diameter	Method
Filter Pack	Type Of	Type Of
Interval	Filter Pack	Surface Seal
Pump	Pump	Depth Of
Туре	Depth	Surface Seal
Type Of Surface Seal		
	Water Use:	
Is well water used for domestic pu	rposes?	
Is well water used for irrigation?		· · · · · · · · · · · · · · · · · · ·
Other uses for well water		
Approx daily well water use (if av		
Number of persons in home using	well water	
	Alternate Water Sources:	
	sting municipal water supply?	
Is the residence serviced by an exist Are there water sources other than	n wells or municipal supplies servin	g the residence?
** **	n wells or municipal supplies servin	g the residence?
Are there water sources other than	n wells or municipal supplies servin	g the residence?
Are there water sources other than	n wells or municipal supplies servin to a municipal water system	

## QUESTIONNAIRE FOR DOMESTIC WATER WELL OWNERS Page 2 of 2

	Description of Well Head Access Conditions:			
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	Well Closure:			
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·	Additional Comments/Notes:	·	·	
		·		
•			· · · · · · · · · · · · · · · · · · ·	



## WORK PLAN

WATER-QUALITY SAMPLING TO SUPPORT THE WATER WELL CLOSURE REMEDIAL DESIGN REPORT

#### WORK PLAN

## WATER-QUALITY SAMPLING TO SUPPORT THE WATER WELL CLOSURE REMEDIAL DESIGN REPORT

#### 1.0 PURPOSE AND SCOPE

Section 9.2.11 of the Record of Decision (ROD) for the Bunker Hill Mining and Metallurgical Complex mandates that "...all ground water wells within the Site that are in the main valley aquifer, either upper zone, lower zone, or other contaminated wells within the Site will be closed or abandoned according to the State of Idaho Requirements." Closure of water wells within the site is addressed in the Water Well Closure Remedial Design Report (RDR). The RDR identifies wells that require closure because they are known to be screened in ground-water units containing metals concentrations in excess of Federally-promulgated drinking water standards. However, as noted in the RDR, water-quality conditions, thus the corresponding need for well uncharacterized in the site populated areas of Page and Pinehurst. Therefore, the purpose of this work plan is to describe a groundwater sampling and analysis program designed to characterize ground-water quality in these areas. The information developed by the program will be used to assess the need for domestic water well closures in these areas due to mining-related impacts.

This document is one of two work plans prepared to describe field activities supporting the Water Well Closure RDR. The companion work plan describes a well owner survey designed to gather information regarding well construction details, well head access conditions, and the presence of unreported tie-ins to municipal water supplies.

#### 2.0 METHODS

The Pine Creek drainage, in and adjacent to the town of Pinehurst, contains 40 known domestic wells, and 20 domestic wells have been identified in Humboldt Gulch, adjacent to the town of Page (Water Well Closure RDR). Fifty percent of the wells in these areas have been selected as sampling sites. The wells selected are listed in Table 1 and Table 2 (attached). The locations of these wells are shown on Figure 1 (attached). All of the identified wells are located within Area I of the Bunker Hill Superfund Site.

The wells selected for sampling transect the Pinehurst and Page areas. Analysis of these samples for the total forms of arsenic, cadmium, lead, and zinc should provide ground-water quality characterizations for the two drainages with respect to prevalent site contaminants. Comparison of the analyses with Federally-promulgated drinking water standards will be used to identify the need for domestic well closure, if any. Well closures will be recommended for areas characterized by arsenic, cadmium, lead, or zinc concentrations significantly in excess of drinking water standards.

As noted in the Water Well Closure RDR, a notice will be placed in the local newspaper(s) that describes the need for selected well closures within the site. The notice will state that individuals owning wells may be contacted in order to solicit additional information regarding well construction and/or water-quality samples. After the notice has been run for several days, well owners listed on Table 1 and 2 will be contacted by letter to initiate the sampling program; an example of such a letter is provided as Attachment 1. The mailing will be followed by telephone contact with the targeted well owners after approximately one week to establish personal contact, respond to any outstanding questions, and arrange a date and time for sample collection. The owners will be provided with a copy of the sampling report and the

analytical results for their wells within 30 days of receipt of the analytical results from the subcontracting laboratory.

All work will be performed in accordance with the substantive requirements of the Bunker Hill Site RI/FS Health and Safety Plan. The ground-water samples will be collected from a tap within the residence supplied by the water well, if appropriate. If possible, the sample will be taken from the tap closest to the well to minimize potential water-quality impacts from piping. will be made to purge the system prior to sampling to obtain water more directly from the ground-water system. If a given well is not connected to a piping system, attempts will be made to collect a sample directly from the well using a bailer or hand pump. Sampling information will be recorded on a ground-water sampling Such information includes general wellrecord (attached). construction information and depth-to-water measurements, if collection of such data is feasible.

The samples will be collected, handled, and delivered to the subcontracting laboratory according to the general requirements of the Overall Field Operating Plan, as described in the following Standard Operating Procedures (SOP):

- SOP A-1 Sample Handling and Preservations SOP A-5 Quality Control Sampling
- SOP A-7 Ground-Water Sampling

Expected minor deviations from the protocols set forth in these SOPs are described below. These deviations are not anticipated to affect the analytical results.

Standard Operating Procedure A-1 indicates that collected for metals analyses will be acidified and checked with pH paper to ensure that the sample is preserved at a pH less than 2. However, for the sampling program described herein, sample bottles will be received from the subcontracting laboratory with pre-placed preservative acid, ensuring that the appropriate pH is maintained without the need for pH measurement.

Standard Operating Procedure A-5 requires that equipment blanks (rinsates) and blind duplicates be collected at a frequency of one in every 20 samples. Therefore, because a total of 30 wells are expected to be sampled under the program described herein, one of each type of these quality control samples will be collected.

Standard Operating Procedure A-7 indicates that pH and conductivity measurements should be made using an Orion Model SA 250 pH meter and a YSI Model 33 conductivity meter, respectively. However, pH will be measured using an Orion Model SA 230 or Markson Model 6099 pH meter and conductivity will be measured using a YSI Model 3000 or a Cole Parmer Model 1481-60 conductivity meter, depending on the entity conducting the field program.

Laboratory analyses will be conducted in accordance with the general requirements of the Bunker Hill Unpopulated Areas RI/FS Laboratory Analytical Protocol (LAP), Inorganics and Conventionals. The LAP indicates that arsenic, cadmium, lead, and zinc should be analyzed using EPA method 200.7 (Inductively Coupled Plasma - Atomic Emission Spectroscopy). However, consultation with SVL Analytical in Kellogg indicates that, for the purposes of this project, arsenic and lead may be better analyzed using Graphite Furnace methods (arsenic: EPA 206.2; lead: EPA 239.2) in order to meet the minimum detection levels necessary for comparison with Federal drinking water standards. Therefore, the following analytical methods will be used:

•	Arsenic	EPA 20	5.2
•	Cadmium	EPA 200	0.7
•	Lead	EPA 239	9.2
•	Zinc	EPA 200	0.7

#### DRAFT

These analytical methods are among those approved for assessing compliance with Federal drinking water standards in 40 CFR Part 141, "National Primary Drinking Water Regulations" (arsenic, cadmium, and lead) and in 40 CFR Part 143, "National Secondary Drinking Water Standards" (zinc).

#### 3.0 SCHEDULE

As previously noted, this document is one of two work plans prepared to describe field activities supporting the Water Well Closure RDR. The survey described in the companion work plan will be issued to the owners of wells identified as requiring closure or possibly requiring closure, pending collection and evaluation of well construction details. The survey may need to be issued to well owners in Pinehurst and Page, depending on the results of the ground-water sampling and analysis program described herein. Therefore, implementation of the ground-water sampling and analysis program prior to distribution of the well owner survey should increase project efficiency.

Information provided by the activities described in this work plan is needed to expedite the overall well closure program, including distribution of the well owner survey. EPA and IDHW will be notified prior to commencing the water-quality sampling activities. Preparatory activities, including distribution of mailings, are expected to require two days to complete. Actual field sampling is expected to require six to eight days to complete, assuming all wells are sampled and access is not problematic. Sample analytical results should be available within three weeks of sample submittal.

#### 4.0 PRESENTATION OF RESULTS

Pertinent results of the field work described in this work plan will be included in the Residential Areas Annual Remedial Action Work Plans, when applicable.

### ATTACHMENT 1

Dear :
This letter has been sent to you because, according to our records, you are the owner of a water well. The approximate location of this well is shown by number on the attached map.
The purpose of this letter is to request that you allow to obtain a sample of water from a tap fed by the well. The sample will be analyzed for concentrations of arsenic, cadmium, lead, and zinc. The results of the analysis will be used to assess ground-water-quality conditions in your area as part of the general remedial activities occurring in the Bunker Hill Superfund Site. Should you allow a water sample to be collected from your well, you will be provided with a copy of the sampling report and the analytical results. All results will be kept confidential.
You will be contacted by phone or in person in the near future to discuss any questions you might have about this program and to arrange for a time when sampling can be done. In the interim, you may contact at with any concerns. If you agree to allow the requested sample to be collected, please indicate so by signing the authorization below; this authorization will be collected by field personnel at the time of sampling.
Thank you very much for your time.
Sincerely yours,
WELL OWNER AUTHORIZATION
I agree to allow to collect a water-quality sample from my well, located
(Well Owner) (Date)

TABLE 1
Pinehurst Area

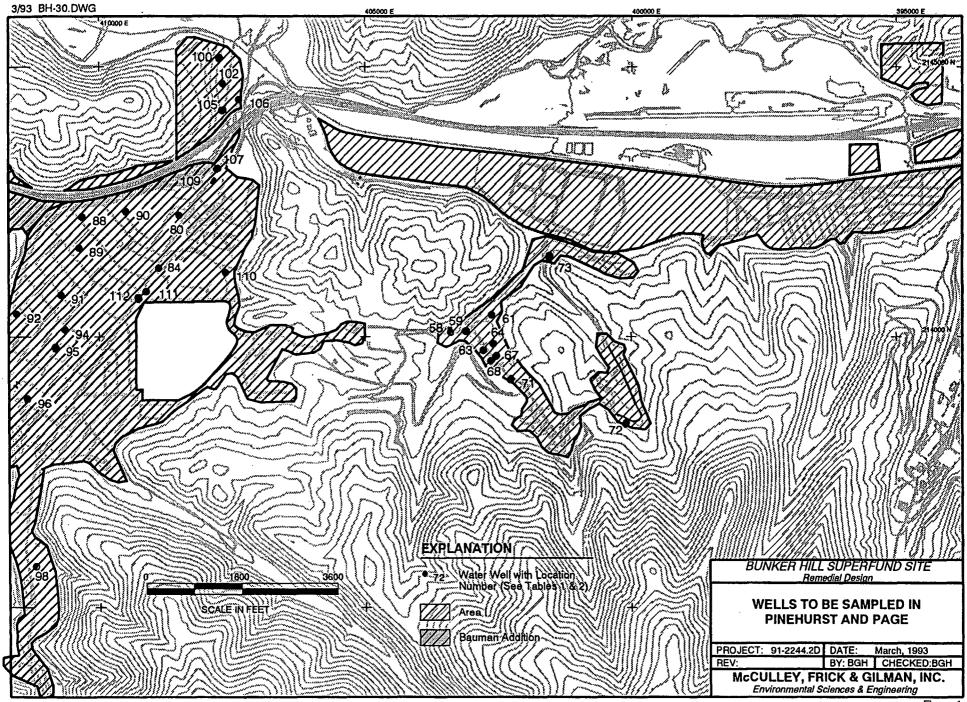
Well Number	Ownership/Address	Hole	Hole	Casing	Casing	Comments
In RDR	D C	Diameter	Depth	Diameter	Depth	
No. 80	Dora Garner	10"	95'	8"	95'	Domestic & commercial use
	HCO1 Box 29					Water used for Pinehurst
	Pinehurst, Id. 83850					Laudromat & drinking
	(208) 682 – 2511					
	(208)682-3212					
No. 84	William McBaine	10"	98'	10"	98'	Unused commercial well; capped
	P.O. Box 644					
	Osburn, ID 83849					
	NA			***		<u> </u>
No. 88	Pearl Wright	NA	· NA	NA	NA	Domestic use
	P.O. Box 636					·
	Pinehurst, Id. 83850					
	(208) 682-3350				<del></del>	
No. 89	Mrs. Harry Hagaman	NA	NA	NA	NA	Domestic use
	P.O. Box 221	_				
	Pinehurst, Id. 83850					
	(208) 682-2346					
No. 90	Glen Nickerson	NA	NA	NA	NA	Well not in use
	P.O. Box 830					
	Pinehurst, Id. 83850					
	(208) 682-2022					
No. 91	Shirley Spoor	NA	NA	NA	NA	Domestic use
	P.O. Box 691					
	Pinehurst, Id. 83850					
	(208) 682 – 2222					
No. 92	Robert Caldwell	NA	NA	6"	75'	Domestic use
	P.O. Box 882					•
	Pinehurst, Id. 83850					·
	(208) 682-2330	,				
No. 94	Quill McBrien	NA	NA	. <b>4</b> "	6'	Domestic use
	P.O. Box 481					
	Pinehurst, ID 83850					
	NA					
No. 95	Harry Winkler	NA	NA	6"	97'	Domestic use
	P.O. Box 632		•			
•	Pinehurst, Id. 83850					
	(208) 682-2459	•				
No. 96	Clarence E. Carlson	NA	NA	4"	30'	Domestic use
	HCO1 Box 08					
	Pinehurst, Id. 83850					
	(208) 682-4155					·
No. 98	William McLeod	NA	NA	3°	35'	Domestic use
	HCO1 Box 20					
	Pinehurst, Id. 83850					
	(208) 682-3220					·

TABLE 1
Pinehurst Area

Well Number	Ownership/Address	Hole	Hole	Casing	Casing	Comments
In RDR	<u> </u>	Diameter	Depth	Diameter	Depth	
No.100	Margie Wilmey	NA	NA	NA	NA	Domestic use
	P.O. Box 484					
	Pinehurst, Id. 83850					
	(208) 682-2053					
No.102	Earl J. Allman	NA	NA	NA	NA	Domestic use
	P.O. Box 182					
}	Pinehurst, Id. 83850					
	(208) 682-3336					
No.105	Earl J. Allman	NA	NA	NA	NA	Domestic use
	P.O. Box 182					Well services six houses
	Pinehurst, Id. 83850					•
	(208) 682-3336					
No.106	Janet McEnany	NA	NA	NA	NA	Domestic use
	P.O. Box 770					•
	Pinehurst, Id. 83850					
	(208) 682-3819					
No.107	Charles Carver	NA	NA	NA	NA	Domestic use
,	P.O. Box 153					·
	Pinehurst, Id. 83850					
	(208) 682-2731			•		
No.109	Arnie Wick	NA	NA	12"	15'	Domestic use
	P.O. Box 222					
	Pinehurst, Id. 83850				-	
	(208) 682-2156					
No.110	William McBaine	NA	NA	10"	100'	8" pipe added on to well #84
	P.O. Box 644					
	Osburn, Id. 83849					·
	(208) 753 – 9355					· · · · · · · · · · · · · · · · · · ·
No.111	Evert Arvidson	NA	NA	5"	100'	Domestic use
	P.O. Box 336					Evert's Electric Center
	Pinehurst, Id. 83850					·
	(208) 682-2612					
No.112	Sherman Watts	NA	NA	NA	NA	Well not used
	P.O. Box 150					Watt's Electric
	Pinehurst, Id. 83850					
	(208) 682-2153					

TABLE 2 Page Area

Well Number	Ownership/Address	Hole	Hole	Casing	Casing	Comments
In RDR		Diameter	Depth	Diameter	Depth	
No. 58	Jon Hagaman	NA	NA	24"	14'	Domestic use
	P.O. Box 249					
	Smelterville, Id. 83868					
	(208) 784-4791					
No. 59	Gerald Furnish	NA	NA	NA	19'	Domestic use
	P.O. Box 594					Hand dug
	Smelterville, Id. 83868					
	(208) 784-4791					
No. 61	Ernie Abey	NA	NA	NA	NA	Domestic use
	P.O. Box 72					
	Kellogg, Id. 83837					
	NA					
No. 63	Marvin Benjamin	NA	NA	4"	50'	Domestic use
	P.O. Box 399					Common well with neighbors
	Smelterville, Id. 83868					(fire protection)
	(208) 784-0321					
No. 64	Elmer Kauppi	NA	NA	Box	5'	Domestic use
,	P.O. Box 704					Lined with concrete blocks
	Kellogg, Id. 83837					Common use with Leonard George
·	(208) 784-5693					
No. 67	Reed Block	NA	NA	4"	65'	Domestic use
	P.O. Box 197					·
	Smelterville, Id. 83868				•	
	(208) 786-6792					
No. 68	Joyce Valerio	NA	NA	5"	50'	Domestic use
	P.O. Box 61					
	Kingston, Id. 83839					
	NA					· · ·
No. 71	June Roe	NA	NA	6"	36'	Domestic use
	P.O. Box 507					
	Smelterville, Id. 83868					
	(208) 786-3155					
No. 72	Dean Broders	NA	NA	NA	NA	Domestic use
	P.O. Box 4561					
	Coeur d'Alene, Id. 83814					
	(208)784-5101	···				
No. 73	Joseph Allen	NA	NA	NA	NA	Domestic use
	P.O. Box 125					
	Kellogg, Id. 83837					
	(208) 783 – 9061					
	(208) 784-8721					



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Sample	ed by:					<del>_</del>			ickup (ft.):			
Measu	ring Point (N	AP) of Well:_				·			Vater Level (ft. B			
Screen	ed Interval (	(ft.BGL):							th (ft. BGL): iameter (in ID):_			
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WELL CLOSURE RECORD FORM

#### WELL CLOSURE RECORD

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Agent	Depth (feet)	Depth (feet)	Time	Time		Perforation	Depth (feet)	Depth (feet)  Materi	Time	Time	Pressure

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	Alternate Water Sources	<b>:</b>			
contractor Information:					
Name		Date			
Company Equipment On Site					
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Materials		Material Volumes		Date(s) Inst	alled End
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APPENDIX C

### APPENDIX C

RESULTS OF MAGNETOMETRY SURVEY
CIA MIDDLE AND WEST CELLS

#### 1.0 INTRODUCTION

Several industrial wells are thought to be covered by the CIA. The wells were identified in a literature search described in the Technical Memorandum (McCulley, Frick & Gilman, Inc, 1992a; see text for reference). Due to the large volumes of water typically required of industrial wells, these wells are thought to have minimum diameters of 8 inches. The wells are thought to be completed in the Lower Zone and are in the eastern valley which has local downward gradients between the Upper and Lower Zones. Therefore, if the well casings are corroded or an annular space filled with high permeability materials (filter pack material) exists through the Confining Zone, the wells potentially threaten the Lower Zone with metal-rich Upper Zone ground water from the CIA. Therefore, measures have been taken to locate wells covered by the CIA.

#### 2.0 FIELD METHODS

A portable proton precession magnetometer was considered the most accurate instrument available for possibly locating the covered wells. Principles underlying the use of the instrument and related data-reduction techniques are described briefly in the Section 4.2.1 of the Technical Memorandum. The magnetic survey was performed on April 13, 16 and 18, 1992. The survey grid consisted of stations at 100-foot intervals across the CIA middle and west The grid lines were oriented orthogonally along eastcells. west/north-south bearings (Figure C-1). The grid was composed of 351 stations. Baseline readings were taken approximately every hour, and all data were corrected for natural temporal drifts in Three instrument the local magnetic field (Tables C-1 and C-2). readings were measured at each station location, and the average of the three readings was used for data reduction and analysis.

As stated in the Technical Memorandum, the CIA is subject to various types of extraneous "noise" that may affect the magnetic survey. Possible sources of induced "noise" noted during the survey included power lines, roads, fences, reinforcing steel in concrete, exposed and potentially buried steel and iron debris, pipelines, steel monitoring-well surface casings, buildings, and magnetic minerals in the slag (e.g., magnetite). Abundant steel pipe exposed at the surface of the west cell was noted during the magnetic survey. Field personnel performing the magnetic survey estimated a high potential for inherent background magnetic "noise" from man-made structures.

#### 3.0 RESULTS AND DISCUSSION

Figures C-2 and C-3 are magnetic maps of the CIA middle and west cells, respectively. The grids on each figure are combined and shown relative to one another on Figure C-1. The magnetic maps on Figures C-2 and C-3 show very few features that could indicate buried objects such as well casings. The presence of metallic objects of various sizes and the probable presence of magnetite or other magnetic compounds in the slag on the CIA west cell apparently serve to mask magnetic effects which might be associated with abandoned industrial wells covered by the CIA. One fairly weak anomaly is present in the CIA middle cell, centered at approximately 2,143,990 N and 399,610 E (Station B15). anomaly may be associated with a length of pipe observed on the ground during the field survey. In the west cell area, three much stronger anomalies were observed, centered at approximately 2,144,090 N and 398,610 E (Station A25), 2,144,390 N and 399,110 E (Station AA20), and 2,144,390 N and 397,910 E (Station AA32). Field notes indicate that the anomaly at station AA32 is centered on an access road north of the CIA west cell and not actually in the slag pile. The anomaly could be associated with some object buried beneath the road, such as a pipeline or buried power line.

A sewer manhole was observed near the station. Effects of the other anomalies on the CIA west cell are restricted to a rather small radial area of approximately 100-200 feet. These localized, intense anomalies could indicate a covered metallic structure. The anomalies are distant from the estimated locations of the covered wells (Figures C-2 and C-3), suggesting that the anomalies result from other covered metallic objects (such as large pieces of scrap metal pipe, metal drums, etc.).

TABLE C-1. HORIZONTAL AND VERTICAL AXES FOR CIA MAGNETOMETRY SURVEY (CIA Middle Cell)

	÷		• •			
	MFG		•			CORRECTED
	STATION			NORTHING	<b>EASTING</b>	READING
_	DESIGNATION	DATE	TIME	(Y)	(X)	(Z)
7		04/16/02	025	21/2000	401010	56607
L		04/16/92	83 <i>5</i> 843		401010	56701
L		04/16/92 04/16/92	844		400910	56727
L		04/16/92	845		400710	56746
L L		04/16/92	846		400710	56689
L		04/16/92	847		400510	56768
L		04/16/92	848		400410	56713
1	.,	04/10/32	040	2142350	400410	30713
K	<b>1</b>	04/16/92	753	2143090	401010	56658
K	2	04/16/92	752	2143090	400910	56691
K	3	04/16/92	751	2143090	400810	56655
K	4	04/16/92	750	2143090	400710	56687
K	·5	04/16/92	749	2143090	400610	56600
K	<b>.</b> 6	04/16/92	748	2143090	400510	56723
K	7	04/16/92	747	2143090	400410	56889
K	<b>.</b> 8	04/16/92	746	2143090	400310	56646
K	9	04/16/92	745	2143090	400210	56663
7.	•	04/16/92	725	2143190	401010	56638
J:		04/16/92	726		400910	56736
J2 J3		04/16/92	720		400910	56627
J.		04/16/92	728	2143190	400710	56631
J.		04/16/92	729	2143190	400610	56599
J.		04/16/92	730	2143190	400510	56629
J		04/16/92	731	2143190	400410	56632
J		04/16/92	732	2143190	400310	56724
J		04/16/92	733	2143190	400210	56704
	10	04/16/92	734	2143190	400110	56598
J		04/16/92	735	2143190	400010	56653
					101010	
I		04/16/92	636	2143290	401010	56646
12		04/16/92	638	2143290	400910	56620
13	_	04/16/92	640	2143290	400810	56636
<b>I</b> 4		04/16/92	645	2143290	400710	56630
15		04/16/92	658	2143290	400610	56606
16		04/16/92	662	2143290	400510	56603
17	1	04/16/92	666	2143290	400410	56586
18		04/16/92	670	2143290	400310	56568
IS		04/16/92	674	2143290	400210	56562
IJ	.0	04/16/92	678	2143290`	400110	56612
II		04/16/92	682	2143290	400010	56607
I1	.2	04/16/92	686	2143290	399910	56631

TABLE C-1. HORIZONTAL AND VERTICAL AXES FOR CIA MAGNETOMETRY SURVEY (CIA Middle Cell)

	MFG		(**************************************	,		CORRECTED
	STATION			NORTHING	EASTING	READING
	DESIGNATION	DATE	TIME	(Y)	(X)	(Z)
	I13	04/16/92	690	2143290	399810	56695
	I14	04/16/92	694	2143290	399710	56553
				•		
	H1	04/13/92	1193	2143390	401010	56953
	H2	04/13/92	1192	2143390	400910	56998
	H3	04/13/92	1191	2143390	400810	57242
	H4	04/13/92	1190	2143390	400710	56977
	H5	04/13/92	1189	2143390	400610	57015
	H6	04/13/92	1188	2143390	400510.	56912
	H7 .	04/13/92	1187	2143390	400410	56768
	H8	04/13/92	1186	2143390	400310	56762
	H9	04/13/92	1185	2143390	400210	56817
	H10	04/13/92	1184	2143390	400110	56799
	H11	04/13/92	1183	2143390	400010	56760
	H12	04/13/92	1182	2143390	399910	56691
	H13	04/13/92	1181	2143390	399810	56806
	H14	04/13/92	1180	2143390	399710	56778
	H15	04/13/92	1179	2143390	399610	56755
	H16	04/13/92	1178	2143390	399510	56792
	H17	04/13/92	1177	2143390	399410	56780
	G1	04/13/92	1097	2143490	401010	56411
	G2	04/13/92	1098	2143490	400910	56457
	G3	04/13/92	1099	2143490	400810	56451
	G4	04/13/92	1100	2143490	400710	56431
	G5	04/13/92	1101	2143490	400610	56359
	G6	04/13/92	1102	2143490	400510	56471
	G7	04/13/92	1103	2143490	400410	56424
	G8	04/13/92	1104	2143490	400310	56414
	G9	04/13/92	1105	2143490	400210	56414
	G10	04/13/92	1106	2143490	400110	56392
	G11	04/13/92	1107	2143490	400010	56396
	G12	04/13/92	1108	2143490	399910	56394
•	G13	-04/13/92	1109	2143490	399810	56373
	G14	04/13/92	1110	2143490	399710	56343
	G15	04/13/92	1111	2143490	399610	56408
	G16	04/13/92	1112	2143490	399510	56421
	G17	04/13/92	1113	2143490	399410	56504
				•		
	F1	04/13/92	1090	2143590	401010	56449
	F2	04/13/92	1089	2143590	400910	56428
	F3	04/13/92	1088	2143590	400810	56474

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TABLE C-1. HORIZONTAL AND VERTICAL AXES FOR CIA MAGNETOMETRY SURVEY (CIA Middle Cell)

MFG		(commis			CORRECTED
STATION			NORTHING	EASTING	READING
DESIGNATION	DATE	TIME	(Y)	(X)	(Z)
F4	04/13/92	1087	2143590	400710	56441
F5	04/13/92	1086	2143590	400610	56462
F6	04/13/92	1085	2143590	400510	56474
F7	04/13/92	1084	2143590	400410	56442
F8	04/13/92	1083	2143590	400310	56423
F9	04/13/92	1082	2143590	400210	56447
F10	04/13/92	1081	2143590	400110	56457
F11	04/13/92	1080	2143590	400010	56454
F12	04/13/92	1079	2143590	399910	56464
F13	04/13/92	1078	2143590	399810	56434
F14	04/13/92	1077	2143590	399710	56426
F15	04/13/92	1076	2143590	399610	56429
F16	04/13/92	1075	2143590	399510	56433
F17	04/13/92	1076	2143590	399410	56545
E1	04/13/92	994	2143690	401010	56639
E2	04/13/92	995	2143690	400910	56549
E3	04/13/92	996	2143690	400810	56603
E4	04/13/92	997	2143690	400710	56551
E5	04/13/92	998	2143690	400610	56602
E6	04/13/92	999	2143690	400510	56618
E7	04/13/92	1000	2143690	400410	56618
E8	04/13/92	1002	2143690	400310	56724
E9	04/13/92	1004	2143690	400210	56532
E10	04/13/92	1006	2143690	400110	56540
E11	04/13/92	1008	2143690	400010	56566
E12	04/13/92	1010	2143690	399910	56560
E13	04/13/92	1012	2143690	399810	56510
E14	04/13/92	1014	2143690	399710	56508
E15	04/13/92	1016	2143690	399610	56522
E16	04/13/92	1018	2143690	399510	56508
E17	04/13/92	1020	2143690	399410	56629
_					
 D1	04/13/92	1045	2143790	401010	56560
D2	04/13/92	1046	2143790	400910	56573
D3	04/13/92	1047	2143790	400810	56561
D4	04/13/92	1048	2143790	400710	56538
D5 .	04/13/92	1049	2143790	400610	56576
D6	04/13/92	1050	2143790	400510	56573
D7	04/13/92	1051	2143790	400410	56493
D8	04/13/92	1052	2143790	400310	56480
				•	

TABLE C-1. HORIZONTAL AND VERTICAL AXES FOR CIA MAGNETOMETRY SURVEY (CIA Middle Cell) (continued)

MFG		(comma	cuj		CORRECTED
STATION			NORTHING	EASTING	READING
DESIGNATION	DATE	TIME	(Y)	(X)	(Z)
DESTONATION			(-)	(11)	(2)
D9	04/13/92	1055	2143790	400210	56471
D10	04/13/92	1056	2143790	400110	56518
D11	04/13/92	1057	2143790	400010	56715
D12	04/13/92	1058	2143790	399910	56487
D13	04/13/92	1059	2143790	399810	56500
D14	04/13/92	1060	2143790	399710	56482
D15	04/13/92	1061	2143790	399610	56497
D16	04/13/92	1062	2143790	399510	56460
D17	04/13/92	1063	2143790	399410	56523
C1	04/13/92	1042	2143890	401010	56443
C2	04/13/92	1041	2143890	400910	56459
C3	04/13/92	1040	2143890	400810	56425
C4	04/13/92	1039	2143890	400710	56435
C5	04/13/92	1038	2143890	400610	<b>5</b> 6445
C6	04/13/92	1037	2143890	400510	56440
C7	04/13/92	1036	2143890	400410	56436
C8	04/13/92	1035	2143890	400310	56442
C9 .	04/13/92	1034	2143890	400210	56443
C10	04/13/92	1033	2143890	400110	56439
C11	04/13/92	1032	2143890	400010	56518
C12	04/13/92	1031	2143890	399910	56593
C13	04/13/92	1030	2143890	399810	56500
C14	04/13/92	1028	2143890	399710	56503
C15	04/13/92	1026	2143890	399610	56479
C16	04/13/92	1024	2143890	399510	56456
C17	04/13/92	1022	2143890	399410	56450
B1	04/13/92	1141	2143990	401010	56803
B2	04/13/92	1140	2143990	400910	56709
B3	04/13/92	1139	2143990	400810	56675
B4	04/13/92	1138	2143990	400710	56674
B5 _	04/13/92	1136	2143990	400610	56222
B6	04/13/92	1136	2143990	400510	56214
B7	04/13/92	1135	2143990	400410	56255
B8	04/13/92	1134	2143990	400310	56205
В9	04/13/92	1132	2143990	400210	56220
B10	04/13/92	1131	2143990	400110	56261
B11	04/13/92	1130	2143990	400010	56356
B12	04/13/92	1129	2143990	399910	56300
B13	04/13/92	1128	2143990	399810	56189
B14	04/13/92	1127	2143990	399710	59325

TABLE C-1. HORIZONTAL AND VERTICAL AXES FOR CIA MAGNETOMETRY SURVEY (CIA Middle Cell)

MFG	•	(	,		CORRECTED
STATION			NORTHING	EASTING	READING
DESIGNATION	DATE	TIME	(Y)	(X)	(Z)
B15	04/13/92	1126	2143990	399610	56386
B16	04/13/92	1125	2143990	399510	56382
B17	04/13/92	1124	2143990	399410	56351
B18	04/16/92	1019	2143990	399310	56779
B19	04/16/92	1020	2143990	399210	57519
B20	04/16/92	1031	2143990	399110	56818
B21	04/16/92	1032	2143990	399010	57070
B22	04/16/92	1033	2143990	398910	57025
A1	04/13/92	1146	2144090	401010	56765
A2	04/13/92	1148	2144090	400910	56726
A3	04/13/92	1149	2144090	400810	56767
A4	04/13/92	1150	2144090	400710	56717
A5	04/13/92	1153	2144090	400610	56663
A6	04/13/92	1154	2144090	400510	56634
A7	04/13/92	1155	2144090	400410	56689
A8	04/13/92	1156	2144090	400310	56641
A9	04/13/92	1157	2144090	400210	56622
A10	04/13/92	1158	2144090	400110	56703
A11	04/13/92	1159	2144090	400010	56799
A12 ,	04/13/92	1160	2144090	399910	56814
A13	04/13/92	1160	2144090	399810	56775
A14	04/13/92	1162	2144090	399710	56723
A15	04/13/92	1163	2144090	399610	56692
A16	04/13/92	1164	2144090	399510	56769
A17	04/13/92	1165	2144090	399410	56721
A18	04/16/92	953	2144090	399310	56765
A19	04/16/92	954	2144090	399210	56776
A20	04/16/92	963	2144090	399110	56612
A21	04/16/92	964	2144090	399010	56582
A22	04/16/92	965	2144090	398910	56622
A23	04/16/92	966	2144090	398810	56550
A24	04/16/92	967	2144090	398710	56591
 A25	04/16/92	968	2144090	398610	59666
A26	04/16/92	969	2144090	398510	56712
A27	04/16/92	970	2144090	398410	56785
A28	04/16/92	971	2144090	398310	56858
AA1	04/16/92	<b>8</b> 89	2144190	401010	56601
AA2	04/16/92	890	2144190	400910	56604
AA3	04/16/92	900	2144190	400810	56622
AA4	04/16/92	920	2144190	400710	56696

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TABLE C-1. HORIZONTAL AND VERTICAL AXES FOR CIA MAGNETOMETRY SURVEY (CIA Middle Cell) (continued)

MFG			-		CORRECTED
STATION			NORTHING	<b>EASTING</b>	READING
DESIGNATION	DATE	TIME	<u>(Y)</u>	(X)	(Z)
AA5	04/16/92	941	2144190	400610	56651
AA6	04/16/92	942	2144190	400510	56622
AA7	04/16/92	943	2144190	400410	56581
AA8	04/16/92	944	2144190	400310	56593
AA9	04/16/92	945	2144190	400210	56647
AA10	04/16/92	946	2144190	400110	56683
AA11	04/16/92	947	2144190	400010	56688
AA12	04/16/92	948	2144190	399910	56700
AA13	04/16/92	949	2144190	399810	56692
AA14	04/16/92	950	2144190	399710	56675
AA15	04/16/92	951	2144190	399610	56719
AA16	04/16/92	952	2144190	399510	<b>5669</b> 3
AA17	04/16/92	953	2144190	399410	56638

TABLE C-2. HORIZONTAL AND VERTICAL AXES FOR CIA MAGNETOMETRY SURVEY (CIA West Cell)

MFG					CORRECTED
STATION			NORTHING	<b>EASTING</b>	READING
DESIGNATION	DATE	TIME	(Y)	(X)	(Z)
G18	04/18/92	1058	2143690	399310	56613
G19	04/18/92	1059	2143690	399210	56831
G20	04/18/92	1060	2143690	399110	56790
G21	04/18/92	1061	2143690	399010	56814
G22	04/18/92	1062	2143690	398910	56741
G23	04/18/92	1063	2143690	398810	56521
G24	04/18/92	1064	2143690	398710	<b>5</b> 6698
G25	04/18/92	1065	2143690	398610	56636
					•
F18	04/18/92	1047	2143790	399310	57185
F19	04/18/92	1046	2143790	399210	57112
F20	04/18/92	1045	2143790	399110	57111
F21	04/18/92	1044	2143790	399010	56957
F22	04/18/92	1043	2143790	398910	57041
F23	04/18/92	1040	2143790	398810	57171
F24	04/18/92	1039	2143790	398710	57059
F25	04/18/92	1038	2143790	398610	57209
F26	04/18/92	1037	2143790	398510	56998
F27	04/18/92	1036	2143790	398410	57053
F28	04/18/92	1035	2143790	398310	57100
F29	04/18/92	1034	2143790	398210	56987
F30	04/18/92	1033	2143790	398110	57040
F31	04/18/92	1032	2143790	398010	56957
F32	04/18/92	1031	2143790	397910	56918
F33	04/18/92	1030	2143790	397810	56914
F34	04/18/92	1024	2143790	397710	56945
F35	04/18/92	1024	2143790	397610	57316
F36	04/18/92	1020	2143790	397510	57268
F37	04/18/92	1019	2143790	397410	57053
F38	04/18/92	1018	2143790	397310	57145
F39	04/18/92	1016	2143790	397210	57145
F40	04/18/92	1014	2143790	397110	56681
"E18	-04/18/92	974	2143890	399310	56788
E19	04/18/92	975	2143890	399210	57060
E20	04/18/92	976	2143890	399110	56918
E21	04/18/92	978	2143890	399010	57059
E22	04/18/92	979	2143890	398910	56902
E23	04/18/92	980	2143890	398810	56842
E24	04/18/92	981	2143890	398710	56831
E25	04/18/92	982	2143890	398610	56877
E26	04/18/92	983	2143890	398510	56856
- <del></del>	·• • =	- 3-		•	

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TABLE C-2. HORIZONTAL AND VERTICAL AXES FOR CIA MAGNETOMETRY SURVEY (CIA West Cell)

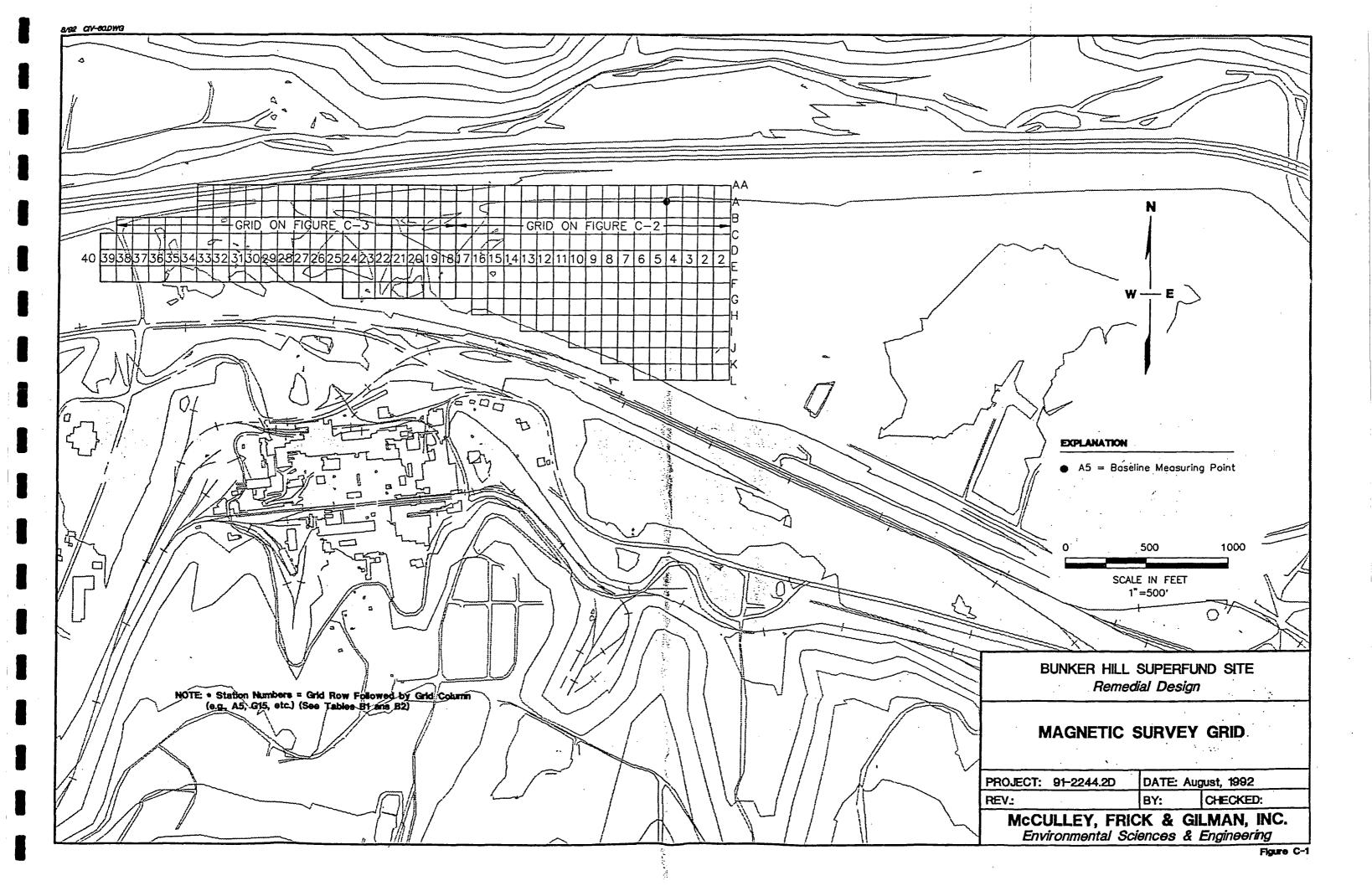
MFG		(continued)			CORRECTED
STATION			NODTHING	EASTING	READING
DESIGNATION	DATE	TIME	NORTHING	EASTING	
DESIGNATION	DATE	TIME	<u>(Y)</u>	(X)	(Z)
E27	04/18/92	984	2143890	398410	56943
E28	04/18/92	986	2143890	398310	56941
E29	04/18/92	987	2143890	398210	56795
E30	04/18/92	990	2143890	398110	56851
E31	04/18/92	991	2143890	398010	57028
E32	04/18/92	992	2143890	397910	56966
E33	04/18/92	993	2143890	397810	56891
E34	04/18/92	994	2143890	397710	56875
E35	04/18/92	995	2143890	397610	56959
E36	04/18/92	996	2143890	397510	56851
E37	04/18/92	997	2143890	397410	56768
E38	04/18/92	998	2143890	397310	56999
E39	04/18/92	999	2143890	397210	56878
E40	04/18/92	1001	2143890	397110	56908
240	0-110/22	1001	2143090	37/110	30300
D18	04/18/92	958	2143990	399310	56664
D19	04/18/92	956	2143990	399210	56920
D20	04/18/92	953	2143990	399110	56836
D21	04/18/92	951	2143990	399010	56688
D22	04/18/92	950	2143990	398910	56585
D23	04/18/92	949	2143990	398810	56665
D24	04/18/92	948	2143990	398710	56794
D25	04/18/92	947	2143990	398610	56637
D26	04/18/92	946	2143990	398510	57259
D27	04/18/92	943	2143990	398410	56600
D28	04/18/92	939	2143990	398310	56886
D29	04/18/92	938	2143990	398210	56695
D30	04/18/92	937	2143990	398110	56865
D31	04/18/92	936	2143990	398010	56641
D32	04/18/92	935	2143990	397910	56723
D33	04/18/92	934	2143990	397810	56739
D34	04/18/92	933	2143990	397710	56656
D35	04/18/92	933	2143990	397610	56716
 D36	04/18/92	932	2143990	397510	56773
D37	04/18/92	931	2143990	397410	56784
D38	04/18/92	930	2143990	397310	56724
D39	04/18/92	928	2143990	397210	56683
D40	04/18/92	926	2143990	397110	56718
C18	04/18/92	890	2144090	399310	56764
C19	04/18/92	891	2144090	399210	56681
C20	04/18/92	892	2144090	399110	56839

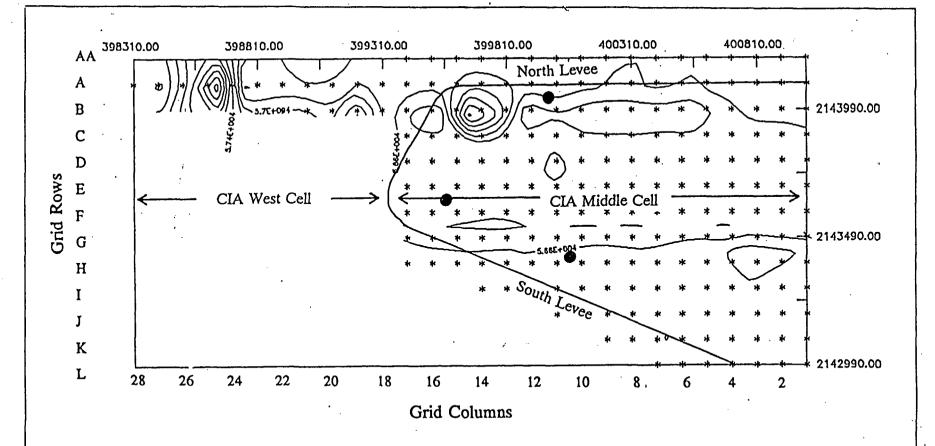
TABLE C-2. HORIZONTAL AND VERTICAL AXES FOR CIA MAGNETOMETRY SURVEY (CIA West Cell)

MFG		(**************************************			CORRECTED
STATION			NORTHING	EASTING	READING
DESIGNATION	DATE	TIME	(Y)	(X)	(Z)
C21	04/18/92	893	2144090	399010	56871
C22	04/18/92	899	2144090	398910	56993
C23	04/18/92	901	2144090	398810	56723
C24	04/18/92	903	2144090	398710	56784
C25	04/18/92	904	2144090	398610	56857
C26	04/18/92	905	2144090	398510	56691
C27	04/18/92	908	2144090	398410	56783
C28	04/18/92	. 909	2144090	398310	56663
C29	04/18/92	910	2144090	398210	56790
C30	04/18/92	911	2144090	398110	56893
C31	04/18/92	912	2144090	398010	56718
C32	04/18/92	913	2144090	397910	56703
C33	04/18/92	915	2144090	397810	56878
C34	04/18/92	916	2144090	397710	56691
C35	04/18/92	917	2144090	397610	56729
C36	04/18/92	918	2144090	397510	56672
C37	04/18/92	919	2144090	397410	56628
C38	04/18/92	920	2144090	397310	56731
C39	04/18/92	921	2144090	397210	56665
C40	04/18/92	922	2144090	397110	56690
B23	04/18/92	818	2144190	398810	56298
B24	04/18/92	819	2144190	398710	56461
B25	04/18/92	821	2144190	398610	56489
B26	04/18/92	824	2144190	398510	56545
B27	04/18/92	825	2144190	398410	56574
B28	04/18/92	826	2144190	398310	56416
B29	04/18/92	827	2144190	398210	56522
B30	04/18/92	827	2144190	398110	56466
B31	04/18/92	828	2144190	398010	56520
B32	04/18/92	829	2144190	397910	56519
B33	04/18/92	830	2144190	397810	56425
B34_	04/18/92	831	2144190	397710	56423
B35	04/18/92	832	2144190	397610	56383
B36	04/18/92	832	2144190	397510	56445
B37	04/18/92	833	2144190	397410	56372
B38	04/18/92	834	2144190	397310	56348
B39	04/18/92	835	2144190	397210	56447
AA18	04/18/92	772	2144390	399310	57112
AA19	04/18/92	774	2144390	399210	56752
AA20	04/18/92	775	2144390	399110	59986
AA21	04/18/92	776	2144390	399010	56541

TABLE C-2. HORIZONTAL AND VERTICAL AXES FOR CIA MAGNETOMETRY SURVEY (CIA West Cell)

				CORRECTED
		NORTHING	EASTING	READING
DATE	TIME	(Y)	(X)	(Z)
04/18/92	777	2144390	398910	58434
04/18/92	779	2144390	398810	56532
04/18/92	<b>78</b> 0	2144390	398710	56794
04/18/92	<b>7</b> 81	2144390	398610	56414
04/18/92	783	2144390	398510	56543
04/18/92	· 786	2144390	398410	56211
04/18/92	<b>7</b> 87	2144390	398310	56305
04/18/92	788	2144390	398210	56708
04/18/92	<b>79</b> 0	2144390	398110	56345
04/18/92	<b>7</b> 93	2144390	398010	56834
04/18/92	<b>7</b> 95	2144390	397910	61614
04/18/92	798	2144390	397810	57218
04/18/92	799	2144390	397710	56403
	04/18/92 04/18/92 04/18/92 04/18/92 04/18/92 04/18/92 04/18/92 04/18/92 04/18/92 04/18/92 04/18/92 04/18/92	04/18/92 777 04/18/92 779 04/18/92 780 04/18/92 781 04/18/92 783 04/18/92 786 04/18/92 787 04/18/92 788 04/18/92 789 04/18/92 790 04/18/92 793 04/18/92 795 04/18/92 798	DATE         TIME         (Y)           04/18/92         777         2144390           04/18/92         779         2144390           04/18/92         780         2144390           04/18/92         781         2144390           04/18/92         783         2144390           04/18/92         786         2144390           04/18/92         787         2144390           04/18/92         788         2144390           04/18/92         793         2144390           04/18/92         795         2144390           04/18/92         795         2144390           04/18/92         798         2144390	DATE         TIME         (Y)         (X)           04/18/92         777         2144390         398910           04/18/92         779         2144390         398810           04/18/92         780         2144390         398710           04/18/92         781         2144390         398610           04/18/92         783         2144390         398510           04/18/92         786         2144390         398410           04/18/92         787         2144390         398310           04/18/92         788         2144390         398110           04/18/92         793         2144390         398010           04/18/92         795         2144390         397910           04/18/92         798         2144390         397810



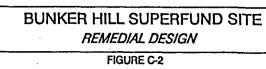


Contour Interval = 200 Gammas

Approximate Location of Covered Industrial Wells

## **NOTES:**

- \* Y-Axis On Right Side Of Graph = Northing Top Axis On = Easting
- \* Station Numbers = Grid Row Followed By Grid Column (e.g., A5, G15, etc.) (See Tables C-1 and C-2)

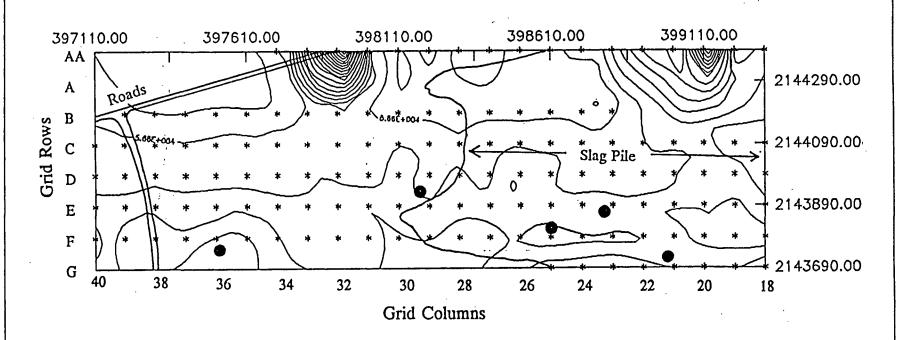


MAGNETIC SURVEY

CIA MIDDLE CELL

PROJECT No. 91-2244.2D DATE: JANUARY, 1993
FILE: IMM 0:\(\text{BRAD}\)2244.2D\(\text{APPCFIGZ.DRW}\)
BY: BCP CHECKED: BGH

McCULLEY, FRICK & GILMAN, INC. Environmental Sciences and Engineering

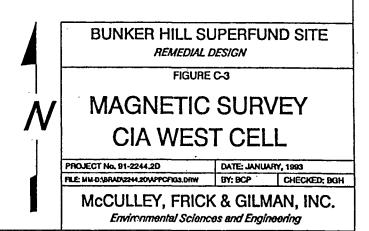


Contour Interval = 200 Gammas

• Approximate Location of Covered Industrial Wells

## **NOTES:**

- \* Y-Axis On Right Side Of Graph = Northing Top Axis On Graph = Easting
- \* Station Numbers = Grid Row Followed By Grid Column (e.g., A5, G15, etc.) (See Tables C-1 and C-2)





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